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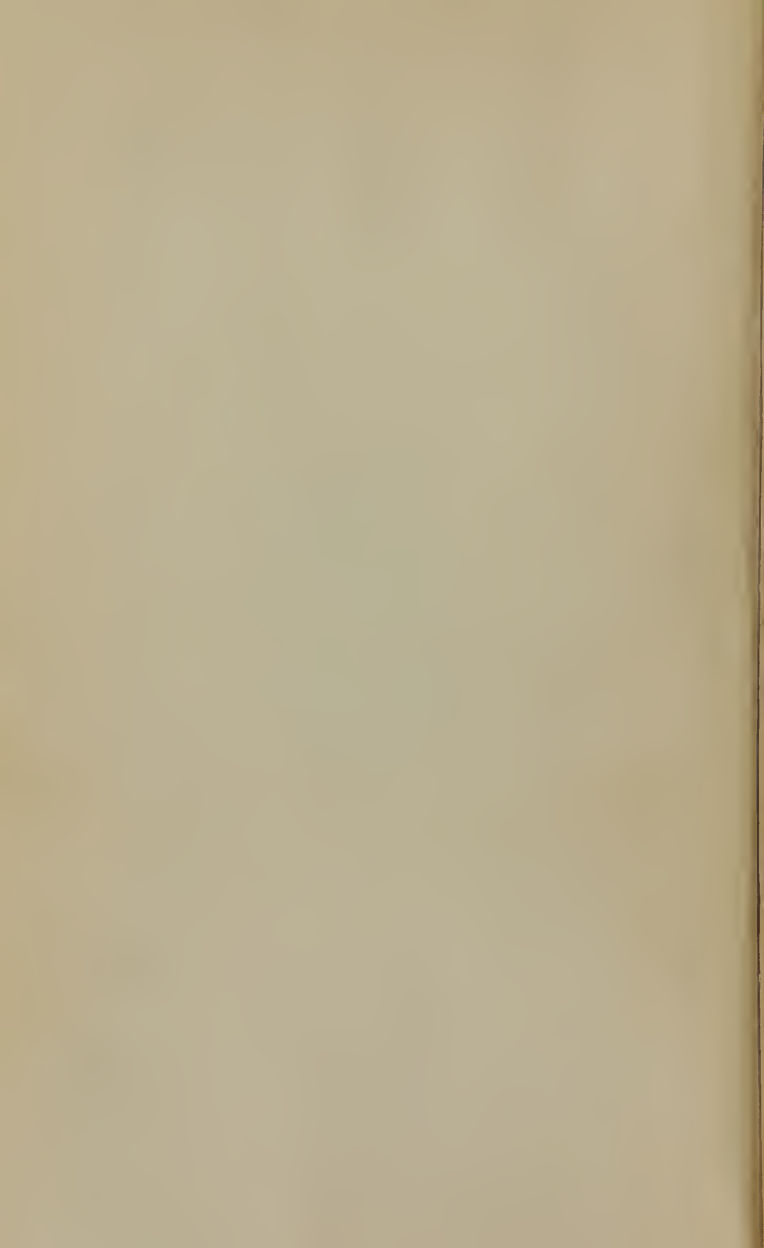
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Section \_\_\_\_\_  
**ANNEX**

Number 111375





A  
POPULAR  
TREATISE ON THE TEETH:

EMBRACING

A DESCRIPTION OF THEIR STRUCTURE, THE DISEASES TO  
WHICH THEY ARE SUBJECT, AND THEIR TREAT-  
MENT, BOTH FOR THE PREVENTION  
AND CURE OF THOSE  
DISEASES ;

TOGETHER WITH AN ACCOUNT

OF THE

USUAL METHODS OF INSERTING ARTIFICIAL TEETH!

111375

BY ROBERT ARTHUR,

DOCTOR IN DENTAL SURGERY, AND MEMBER OF THE AMERICAN SOCIETY OF  
DENTAL SURGEONS.

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To  
PROFESSOR CHAPIN A. HARRIS,  
OF THE  
BALTIMORE COLLEGE OF DENTAL SURGERY,  
HIS INSTRUCTOR AND FRIEND,  
THIS WORK  
IS GRATEFULLY INSCRIBED, BY  
THE AUTHOR.





## P R E F A C E .

THERE are many who, having experienced the benefits of judicious curative operations, upon the teeth, are ready to admit the claims of Dental Surgery, to public confidence. But there is a large class of the community who look upon it as not only a useless, but positively injurious vocation ; or, regard it, at least, as offering but temporary advantages. That this unjust estimate is owing, principally, to the imperfect manner in which it is but too commonly practiced, every intelligent dentist, daily, perceives and deplores. Of this fact, however, the public are, almost entirely, ignorant. Many persons never think of applying to a dentist, except when their teeth give them pain, and then, with little hope of receiving any further benefit than that of getting rid of those which are troublesome. But this state of things should not continue, for it can very easily be shown, that operations upon the teeth, properly performed, will effectually and permanently arrest the progress of diseases, to which these organs are so commonly subject ; and that most of these diseases, by timely and well-directed attention, may be prevented. The author has attempted to do this in the following pages, by presenting a popular view of : the structure and anatomy of the teeth ; the manner in which they are formed ; their diseases, and those to which they give rise, with a detailed account of the operations by which they may be cured ; and directions for the prevention of those diseases. In doing this, he has endeavored to present the subjects in a manner sufficiently full, to be intelligible and useful, without entering so deeply into details as to be tedious. How far he has accomplished his object the reader must judge.

As this account will make the reader acquainted with the principles upon which the practice of dental surgery is founded, it will furnish him with a standard, by which he

may form some notion of the qualifications of a dentist, when he finds operations upon his teeth necessary. An attempt has been made, in the last chapter, to assist him in applying the contents of the book to this purpose.

It must be distinctly understood, as the foregoing paragraph implies, that the author does not pretend to make every one his own dentist, nor to furnish him with information which will enable him to operate upon the teeth of members of his family. Such an attempt, it will be seen, in the course of the treatise, would have been useless; for, to perform operations upon the teeth, which will be permanently successful, requires, in the operator, constant practice.

If, in the course of this treatise, it be found that the author has expressed himself in severe terms, with regard to the malpractices which, at the present day, prevail in his profession, the reader will, at least, acknowledge, when he is led to consider their injurious consequences, that they are deserved. He must, however, disclaim all special personal allusions. One of his objects, in undertaking this task, was to expose imposture, in the broadest light; and this, as far as he was able, he has done, regardless of every thing but the good result which must follow such an exposition.

To the members of the dental profession, he offers no apology for presenting this work to the public. Every one amongst them who, in any degree, regards the good of the community, or the advancement of the calling, in which he is engaged, will be ready to favor any effort toward the accomplishment of these objects; and that such is the tendency, at least, of the following pages must be admitted.

As regards the literary execution of the work, the writer must claim indulgence. Many conflicting circumstances have prevented him from giving to it the close attention which he could have desired, and he was compelled to place it before the public, in its present condition, or throw it aside, altogether.

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# POPULAR TREATISE ON THE TEETH.

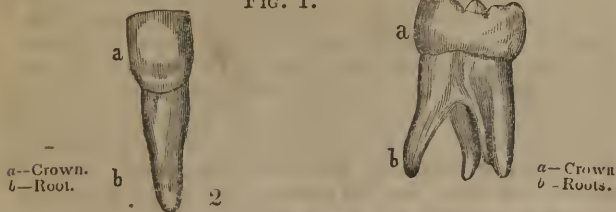
## CHAPTER I.

### ANATOMICAL DESCRIPTION OF THE TEETH AND MOUTH.

Structure of the teeth—Their anatomy—Enamel—Bony portion—Cementum—Classification of the teeth—Sockets—The upper jaw—The antrum—The lower jaw—Muscles by which the jaw is moved—Blood vessels and nerves of the teeth—Salivary glands—Mucous glands—Some knowledge of the anatomy of the teeth and mouth, necessary to a comprehension of the subsequent portions of this work.

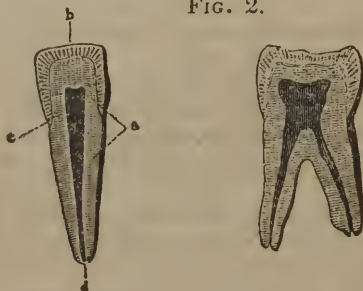
THE human teeth, when in healthy condition, present, in the mouth, a peculiar, vitreous, pearly white, life-like appearance. Each one, on being removed from its natural position, in the jaw, will strike a common observer as being composed of two distinct parts. That portion, which was concealed by the gum and socket, bears a closer resemblance to the bones, in common, than that which was before visible; it is of a more yellowish hue, and does not seem to be so dense in structure as the latter. These two parts are known as the crown and root, or roots, of the tooth. The accompanying drawings exhibit one of the front, and one of the grinding teeth of the upper jaw :

FIG. 1.



The crown, however, is not wholly composed of the substance, which presents such a beautiful appearance; this substance is a covering, only, for the body of the tooth, which is made up almost entirely of bone, like that which constitutes the root. This is rendered more apparent by the following drawings, which represent sections of two teeth, belonging to the same classes as those above shown:

FIG. 2.



The parts here seen are known as the bony portion, marked *a*, and the enamel, *b*.

The *enamel* covers all that portion of the tooth which passes through the gum, and comes in contact with the food, in the act of mastication. It is admirably adapted, by its peculiar structure and great density, to sustain the immense amount of friction to which it is exposed. It is composed, as is shown in Fig. 2d, of fibrous columns, based upon the bony portion of the tooth, from which it radiates; in consequence of this arrangement it is less liable to fracture, from accidental causes, and is not so readily worn away by the friction of mastication. Its thickness varies, in the different teeth, according to the offices they are required to perform, being greatest on the grinding surfaces of the back teeth, and the cutting edges of the front teeth. Its density exceeds that of all animal productions.

The *bony portion* is, also, of very close texture. It is composed of an immense number of bony tubes, so small as to be imperceptible to the naked eye. These are open toward the cavity, presently to be described, and go, in an undulating course, toward the surface of the bony portion under the enamel, breaking up, on their way, into numerous smaller branches. They are partially filled with white calcareous matter. Their interstices are occupied by a transparent bony substance of nearly the same consistence as the tubes themselves. The bony substance, thus formed, furnished with blood vessels and nerves, is endowed with a low degree of vitality, and is subject to disease and inflammation. When diseased, it becomes so highly sensitive that severe pain is produced by the slightest pressure of hard substances. In a healthy condition, it is, like the other bones, entirely devoid of sensibility. The difference, in regard to density, between the enamel and bony portion of the teeth, will be better appreciated when it is known that, in one hundred parts, the enamel shows, upon analysis, but one part of animal matter, whilst, in the bony portion, twenty-eight parts are found.

Besides these two substances, composing the teeth, a third has lately been shown to exist, between which and the bony portion, the difference, in appearance and structure, is so slight as scarcely to be appreciable; this is called the *cementum*. The *cementum* covers the root of the tooth as the enamel covers the crown: commencing where the enamel terminates, and growing thicker as it approaches the extremity of the root.

In Fig. 2 it will be seen that, within the body of the tooth, there is a cavity, *c*, which grows gradually smaller, forming a narrow canal as it approaches the extremity of the root, where it terminates in a small hole, *d*. This cavity gives lodgment to a fleshy mass, formed by the blood vessels and nerves, which come through the opening, in the extremity of the root, to give vitality to the tooth. Of

this fleshy mass a more particular description will be given when the reader is better prepared to understand it.

The first drawing, in Fig. 1st, represents, beside one of the molar, one of the *incisor* or front teeth; of these there

FIG. 3. are four in each jaw. In Fig. 3, those of the left side of both jaws are shown. As it will be necessary, in the course of this treatise, to make frequent reference to each of the teeth, distinctively, it will be better to give, with a description of them, the names by which they are designated. The four front teeth, of which *a, a* represent two, are called the central incisors; those next adjoining *b, b*, the lateral incisors. It will be seen, on examining the drawings, that the incisors of the upper are somewhat larger than those of the lower jaw; the importance of this difference will, presently, appear. The incisors have, each, a single root, which is conical and somewhat flattened laterally. The name they bear (which comes from the Latin words *in*, into, and *scindere*, to cut,) indicate their office, which is to cut or divide the food.

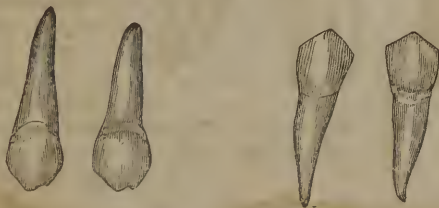
Immediately back of these are the *cuspidati* Fig. 4,

(FIG. 4.)



so called (from *cuspis*, the point of a spear), in consequence of the point in which the crown of each terminates. Of these there are two in each jaw. They are commonly known as the eye-teeth in the upper, and stomach-teeth in the lower jaw, and are, erroneously, supposed to exert considerable influence upon these two organs. Their office is to assist the incisors in the prehension and division of the food. They are more commonly known as canine teeth (from *canis*, a dog), in consequence of the resemblance they bear to some of the teeth of the dog species. Like the incisors, these teeth have each one root, only, but this is longer, larger, and stronger, in proportion to the size of the crown, than that of any of the rest of the teeth.

Next to these are the *bicuspidati*, Fig. 5, (from *bis*  
(FIG. 5.)



twice and *cuspis*,) so called, because the crown of each terminates in two points. There are four of these teeth in each jaw, occupying an intermediate position to the cutting and large grinding teeth. For purposes of mastication, which act they assist in performing, they are the least useful of any of the grinding teeth. They have each a single root, with the exception of that next the canine tooth in the upper jaw, which, occasionally, has two imperfectly developed roots.

Next to those just described are the *molar* (from *molere*, to grind,) or grinding teeth, represented in

FIG. 6.



Fig. 6, of which there are six in each jaw. The name of these teeth indicate their office; and as, by them, mastication is almost entirely performed, their importance is evident. It will be seen, by reference to the drawing, that the upper teeth of this class have three divergent roots, and those of the lower jaw but two. The third molar, generally

known as the wisdom tooth, is represented in the drawing of that of the upper jaw, with three roots; they have commonly, however, but a single root, or rather three in the upper and two in the lower jaw, compressed together and curved somewhat backward—this peculiarity is shown in the drawing representing the third lower molar tooth. The surfaces of the crowns of these teeth are not smooth, but are furnished with elevations and depressions.

These four classes of teeth make up the complete number of those of the human adult—thirty-two. Of these we have given drawings of the sixteen situated on the left side of the mouth, in order to give a correct idea of the form of each. In the next figure the whole of the teeth are shown in their natural positions in the jaws, divested entirely of the gums and soft structures by which they are surrounded.



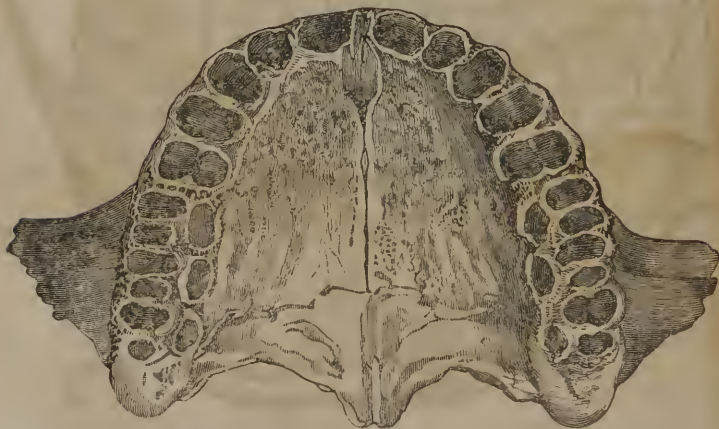
FIG. 7.



In this drawing it is seen that the incisor and canine teeth of the upper jaw, in consequence of their greater size, close a little in front of those of the under jaw. By

this provision they are enabled to perform their proper functions with much greater facility, and are not so quickly worn away, as if their points were to come in contact every time the jaws close. Their action, in cutting the food, is precisely like that of a pair of scissors. The grinding teeth meet in such a manner, when the mouth is closed, that the depressions and elevations upon their crowns, which represent the rough surfaces of mill-stones, come together alternately: the elevations upon the crowns of the upper teeth passing into the depressions of those of the lower jaw and *vice versa*. The advantage gained by this arrangement in facilitating mastication, will become very apparent when it is known that, beside the common motions of depression and elevation, the lower jaw is also capable of being moved laterally and somewhat forward.

(FIG. 8.)



The teeth are all firmly fixed in sockets which are elevated above the level of the jaw-bones. Fig. 8, which



represents an upper jaw from which all the teeth have been removed, will furnish a correct idea of their form. These bony sockets, which are spongy and comparatively soft in their texture, are formed at the same time with the teeth; after the loss of the latter, from age or any other cause, they disappear, and the bone presents, as it did before the teeth were formed, a smooth surface. The sockets are called the *alveolar processes*, a name which implies simply, hollow projections from the body of the bone. The bottom of each is perforated with a small hole, corresponding to that already described, in the extremity of the root of the tooth; through these holes pass the vessels and nerves of the teeth.

Having now taken a cursory view of the teeth, and the sockets in which they are situated, let us examine the jaw bones. As there is so great a difference between the two jaws, it will be better to take them up separately.

The *upper jaw* is composed of two bones which generally remain distinct during life. The place of union corresponds to the middle of the upper lip, and may be seen in both Figures 7 and 8. The upper jaw forms part of the roof of the mouth, the floor of the socket of the eye, the external and lower boundary of the nose, and is united to the cheek bone toward the outside of the face.

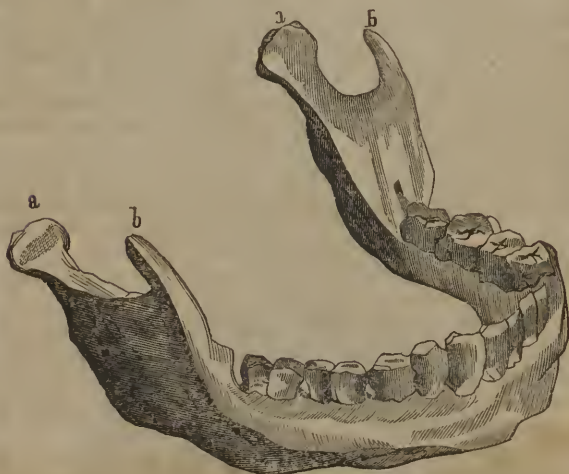
These bones are not solid; there is in each a cavity of considerable dimensions, which is often, as will be seen hereafter, the seat of painful and serious affections. This cavity is called the *antrum*; (a Latin word which signifies a cave,) it is bounded above by that plate of bone which forms the floor of the socket of the eye, and below, by the bases of the alveolar processes of the upper teeth. It communicates with the nose by an opening which, if direct, would be of considerable size; three spongy plates of bone, however, are so placed as to make this opening quite narrow. The membrane which lines the nose is continuous with that of the antrum.

The upper jaw is solidly wedged in between the bones

of the face, with all of which it is joined; it has, consequently, no motion of its own.

The *lower jaw* of an adult, divested of all its appendages except the teeth and their sockets, is exhibited in Fig. 9.

FIG. 9.



In this drawing two plates of bone are seen back of the teeth, rising almost at right angles, from the rest of the jaw. These rami or branches of bone are each surmounted by two small eminences. One of these eminences, marked *a*, is rounded, and forms the ball upon which the bone moves in a shallow socket, situated upon the side of the skull, just in front of the ear. The other, *b*, is flattened, and to it is attached one of the several strong muscles by which the lower jaw is elevated. It will be seen that the lower jaw forms a lever, of which the rounded eminence, *a*, is the fulcrum, and the flattened one, *b*, and the body of the

bone, the arm; the great power of this lever will be better appreciated when the strong muscles, by which it is moved, shall have been described.

The lower jaw-bone is not hollowed out like those of the upper jaw; a canal, about the size of a crow quill, however, commences near the upper and inner surface of the ascending plate above described, and passes along the body of the bone, underneath the alveolar processes of the teeth, till it is joined with that which commences, in like manner, upon the opposite side. Between the first and second bicuspid teeth is a small opening, the use of which, as also that of the canal, will be presently indicated.

At the joint of the lower jaw a membrane, well supplied with a lubricating fluid, is loosely attached, both to the ball and socket; by aid of this arrangement, which is analogous to that of all the joints, it is moved with ease.

The motions of the lower jaw are affected by five pairs of muscles; of these a brief description will be given.

That muscle which we have mentioned as attached to the flattened process of the ascending plate of the lower jaw, is called the *temporalis*, from its situation upon the temple. It is fixed above, to a large part of the side of the head, upon which it is spread out like a fan; its fibres converge from this broad origin, pass underneath an arch formed just below the temple, by a projection of the cheek bone, joined to a similar one coming from the cranium, and are inserted all around the process of bone just described. The use of this muscle is to elevate the jaw.

Another very thick and strong muscle, the *masseter*, or chewing muscle, assists the *temporalis* in the elevation of the jaw. This muscle is fixed along the lower edge of the arch just mentioned, and passes down upon the outside of the ascending plate of bone, to which, and also to the body of the bone itself, it is attached. Both this and the temporal muscle may be felt to swell sensibly under the finger if it is placed over them, when the teeth are strongly compressed together.

These two muscles perform no other office than that of simply carrying the lower jaw against the upper; but, as we have said, this bone moves laterally, and somewhat forward, also. These motions are effected by means of two pairs of muscles, of which, from their situation, it would be impossible to give the unprofessional reader any clear idea.

In opposition to these strong muscles, there is one, comparatively slender, for the depression of the jaw, in the act of opening the mouth. It is fixed to the base of the skull just behind the ear, from which point it goes down to the throat, where, by a very beautiful provision, it passes through a cartilaginous loop, attached to a small bone, situated above the body, commonly known as Adam's apple, and is attached to the inner surface of that part of the lower jaw bone which forms the chin.

It must be understood that there is a pair of each of these muscles, one of which is situated on the right and the other on the left side of the face.

It would be difficult to make intelligible to the reader, entirely unacquainted with anatomy, a minute description of the blood vessels and nerves connected with the teeth; such a description, indeed, is unnecessary to our purpose. A very general account of them, however, will be easily understood, and will be found interesting and useful. It will serve to account for phenomena which, to the patient, would be otherwise incomprehensible, and it will enable individuals who cannot, in time of need, have access to an intelligent dentist or physician, to adopt or direct such measures as may relieve them of great suffering. The truth of this assertion will, as we advance, become obvious.

The teeth receive blood from the large vessels, which give off branches to supply the external parts of the head, the neck, the tongue, the face, and one of the membranes which cover the brain within the cranium—the external carotid arteries. In the lower jaw the dental artery, which comes off from this great vessel near the ear, traverses the canal, above described, giving off, in its course, a branch or

branches to each one of the teeth. Each of these branches passes through the little hole, in the bottom of the socket, through the canal of the root, into the cavity of the tooth. This artery gives off a branch, also, which passes out of the small opening near the bicuspid teeth, to supply the muscles and integuments of the chin. In the upper jaw there is no distinct canal for the purpose of giving passage to the main trunk of the dental artery; the branches which supply the teeth pierce the bone in several places above the alveolar processes.

As it is an invariable law of the animal economy that, wherever arteries exist to carry blood from the heart, to any part of the frame, however distant it may be, veins are provided, for the purpose of conveying it back, after it has given off its vital qualities, to be renewed in the lungs. From this it must be supposed that every artery going to the teeth, must be accompanied by its vein; such is the case, and although the opening, through the extremity of the root of the tooth, is so small as scarcely to be perceptible to the naked eye, it gives passage to an artery, vein, nerve, and, in all probability, to absorbent vessels.

The nerves, which give sensibility to the teeth, the tongue, the nose, the face, the eye, and the ear, have a common origin. The main trunk of the nerve, so extensive in its relations, before it emerges from the cranium, separates into three portions. These three divisions pass out by separate openings, one going to the eye, the forehead and the nose (this branch to the nose is not the nerve which affords to that organ the sense of smell): the second to the teeth of the upper jaw, the lower eyelids, and integuments of the face; and the third to the teeth of the lower jaw, the muscle, in connexion with it, the integuments of the chin, the ear and the tongue; in this last branch is believed to be the sense of taste.

From this intimate connection of the nerves which give sensation to the teeth, with other parts of the face and head, it may be understood why diseased teeth produce

pain in parts which have, seemingly, no relation to them. By a law of sympathy, little understood, indeed, the parts between which there is a communication through the agency of the nerves, afford reciprocally pain or other symptoms of disease, when those which exhibit the disordered symptoms are in a perfectly healthy condition. Thus, the cause of an ear-ache may be traced to a diseased tooth, after applications of every description have been vainly applied to relieve the painful organ, and it is often the case that a sound tooth, in either of the jaws, may ache, in consequence of disease in a tooth situated in the opposite jaw, or in the opposite side of the same jaw. Not only, indeed, are the teeth connected through their nervous relations, with the head and face, but with the stomach; and, indeed, with all parts of the system. This could be shown if it were necessary, by tracing out the branches of the nerve we have just been describing, which connect themselves with other nerves that extend throughout the whole frame. From these facts it may be readily conceived, how diseases of these organs may sympathetically, but seriously, affect very remote parts of the system, and how the teeth may suffer in consequence of a reciprocal influence extending from a distant local disorder. These are facts of the highest importance, and should be carefully regarded. More will be said of this subject in its legitimate place. The course of the nerves, in their distribution to the teeth, is precisely that of the arteries: after penetrating the jaws, in the same manner, they enter through the roots into the cavities of the teeth.

The blood-vessels, nerves and veins, make up the fleshy mass which is lodged in the cavity of each tooth. This is commonly called the "nerve" of the tooth; but a comparatively small portion, only, of this body is made up of nerves; the branch of the nerve, indeed, which passes into the root of the tooth is too small to be perceptible to the naked eye, but it is of sufficient size to give to the pulp, as this body is more properly called, a high degree of sensibility.



But the teeth do not receive the whole of their vitality by way of the internal cavity. Their roots are invested with a membrane through which vessels and nerves pass into the bony substance.

The saliva is the production of three glands, situated in and near the mouth. The largest and most important, the parotid gland, is situated below the ear, between the ascending plate of the lower jaw bone and the base of the skull. A duct, for the purpose of conveying the fluid into the mouth, passes along the cheek and opens just above the second upper molar tooth. The gland next in size, is situated within the circumference of the lower jaw, and extends from the lower canine to the molar tooth. The third is placed underneath the tongue, and pours out its fluid, in conjunction with the gland last described, at the base of the lower incisor teeth.

The saliva, although constantly secreted,\* and poured out of the glands in which it is formed, in greater or less quantities, flows much more rapidly when food is taken into the mouth. During the act of mastication, whilst the food is being bruised and triturated by the teeth, it is penetrated by the saliva, the first use of which is to destroy the cohesion of solid alimentary substances, reduce them to a pulpy mass, and thus render them more easy of deglutition, and in a more proper condition for the action of the stomach. Whether the saliva produces any chemical change in the food, is not satisfactorily ascertained, but it is known that, in proportion as the food is well triturated and mixed with saliva in the mouth, digestion is easy.

Besides the saliva, another fluid is constantly secreted by little glands, which cover all the surfaces of the palate, gums, and inside of the lips and cheeks, but which are greater in number and size toward the back part of the

\* This word, it will be found, is not used in its ordinary sense of *hiding, concealing*, &c., but as indicating the act of producing, from the blood, substances different from the blood itself, or any of its constituents.

palate. This fluid is more tenacious than the saliva, and is known as the mucous secretion of the mouth. The mucous, like the saliva, is thoroughly mixed with the triturated food, and, whatever other purpose it may subserve, it renders deglutition more easy.

We have now attempted, in the most familiar language, and in the smallest possible space, to give to the reader some idea of the anatomy of the teeth and mouth; and even this imperfect description will be found greatly to assist in the comprehension of what is to follow. A more intimate knowledge of human anatomy and physiology than is generally regarded as important, would be of great utility to the community, and the facilities at present offered for its study—facilities which are scarcely beyond the reach of any—serve to render it a most interesting employment for every enquiring mind.

We have, thus far, been occupied with a consideration of the fully developed teeth of the adult. These are called the permanent teeth, in contradistinction to those of the child, which remain in the mouth but a short time, and are, consequently, known as the temporary teeth. A description of the latter, and the manner in which they are formed, will be the subject of chapter second.



## CHAPTER II.

### FORMATION OF THE TEETH.

Development of the teeth furnishing important facts in natural theology—Teeth, as well as all parts of the animal frame, formed from the blood—Appearance of the germs of the teeth when first perceptible to the naked eye—Progressive stages in their development traced—Formation of the bony portion—Formation of the enamel—Their eruption through the gums—Irritation dependent upon the cutting of the teeth—Periods at which they make their appearance—Difficult dentition—Some of its consequences—Good effects of lancing the Gums—Case—Method of performing this operation.

THE most simple of the objects of creation which surround us, are fraught with intense interest, and yet they are enveloped in the deepest mystery. We watch the gradual development of a spire of grass, as it shoots up its beautiful form, and see in it an effect, only, of the all-pervading spirit of the universe. How futile are our efforts to remove the veil and comprehend the causes by the action of which it is produced; and how are we then borne down with the consciousness of our own deep ignorance, and compelled to acknowledge, with humility, that, notwithstanding the apparently great strides of the human understanding, we, as yet, know nothing, absolutely nothing. And when we turn from this simple, though not the less incomprehensible object, to an examination of the animal organization, and, following it in its formative processes, observe how perfectly each organ performs its peculiar office, how exactly preparation is made for the production and reception of a new portion, and the beautiful order in which those parts are removed, which can no longer subsist any useful purpose, we are lost in wonder at the overwhelming evidences of that Being at whose word the universe existed. Although we are unable to comprehend

the manner in which they effect their object, we feel a conviction that we are observing the operations of the fixed and determinate laws of the Infinite and All-wise. The remark has been made, and we have always been struck with the utter blindness which prompted it, that the study of anatomy has a tendency to produce atheistical opinions. We have always thought that he who has examined the construction of the human frame, and has not been able to discover, in the least important portions, the most striking evidences of design, has studied to little purpose.

The development of the human teeth, in consequence of the comparative facility with which it may be studied, and the ease with which the gradual advancement of the germs scarcely perceptible to the naked eye, by regular and invariable steps, to the formation of the perfect teeth, may be observed, is exceedingly interesting and instructive. We are happy to have it in our power to place before even such of our readers as may never have given the subject a single thought, an account which is at once full and intelligible.\*

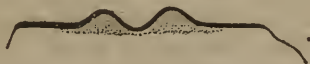
Before entering upon a description of the formation of the teeth, it must be premised that the constituents of these organs, as well as those of the bones, and, indeed, all parts of the animal frame, are contained in the blood. Each part has the ability to select from the vital fluid the particular materials necessary to make up its substance; and it is always found that there is a flow of blood to those parts of the frame in which the formative process is going on,

\* The author has no desire to claim for himself the merit of the investigations which have rendered this subject so plain; but it is unnecessary to weary the unprofessional reader with an enumeration of the various sources whence he has drawn his information. Except when particular cases are cited, this will not, in any instance, be done throughout the treatise. Those, however, who have made Dental Surgery their study, will at once perceive to whom he is indebted for the substance of what he presents.

proportionate to the activity of that operation. This fact, in the development of the teeth, is particularly obvious.

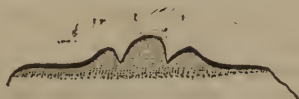
Before it is possible, in the first stages of the formation of the jaws, to discover any traces of the teeth, the alveolar processes have the appearance of two cartilaginous semi-circular grooves. In these grooves, a vertical section, of one of which, for the sake of clearer illustration, may be represented thus:

FIG. 10.



The germs of the teeth first make their appearance in the form of little fleshy masses or papillæ. At first they fill up, entirely, these grooves, and have the appearance shown in

FIG. 11.



We will now take up an incisor tooth of the lower jaw, presenting, as it does, in its formation, an exact type of all the teeth, and proceed to describe the successive stages of its development. It must be understood that the drawings exhibit a side view of this tooth.

Passing from the stage of development represented in Fig. 11, at which the advancing germ fills up the groove, we find that, as the jaws increase in capacity, this germ sinks down and occupies the bottom of an open sac, or bag:

FIG. 12.



About two months after the first trace of the germ becomes perceptible, the sac which was, at first, open, is entirely closed by a membranous covering, which is developed and thrown across from its mouth. This stage is exhibited in

FIG. 13.



The germ has now begun to assume somewhat the form of the future tooth. Between the sacs little fibrous partitions shoot from side to side of what was, till then, a simple groove, and distinct cartilaginous apartments for them are formed. These are the rudimentary sockets of the teeth.

It will be seen, in Fig. 13, that the gum above the sac still remains open, and that there is an inflection dipping down toward the right side, which corresponds to the inside of the mouth. This fold is the first perceptible stage of the formation of the second set of teeth which succeed those, the development of which we are engaged in describing. Thus, in the very beginning of their formation, are the two sets of teeth intimately connected, and this

connection is severed with the destruction only of that which first makes its appearance.

In the next figure other changes have become apparent.

FIG. 14.



The gum above the germ has closed up; the new sac has passed somewhat below the level of the upper surface of the temporary sac, and, in the bottom, a new germ is seen to be forming.

That the reader may have a distinct idea of the relative position of the two sets of teeth at this time, a drawing is here given which, we hope, will remove all obscurity. It represents one-half the lower jaw, from which the inner plate of bone has been removed.

FIG. 15.



In this drawing are seen the germs of the temporary teeth, *a*, and those of the second set, *b*, which resemble little bulbs placed upon the others. Besides these parts, immediately connected with our present subject, the germs

of the three remaining permanent molar teeth, *c*, *d*, *e*, are seen. The first is almost as large as that of the second temporary molar, whilst the other two resemble the little pulps of the anterior permanent teeth.

We will now return to our account of the formation of the tooth which we have taken up as a type. Soon after the sac is closed, the formation of bone commences. The bone is secreted from the germ, the growth of which we have followed from its first appearance till it has assumed somewhat the form of the future tooth. It is first deposited upon that portion which represents the cutting edge of the tooth, from which point it gradually extends upon the crown, till a thin cap over its whole surface

FIG. 16. is formed. Internally to this shell is layer after layer of bone deposited, the pulp from which it is formed growing gradually smaller, until the tooth is completed. As soon, however, as the first layer of bone is formed over the upper portion of the germ, and before the ossification of the root com-



mences, the enamel is deposited upon it, by an organ which at this stage of growth, is developed within the sac for the purpose of producing this substance. The enamel is at first of a dark color and creamy consistence, but it hardens into fibrous layers by a process resembling crystallization. Its growth goes on somewhat like that of the bony substance, with this difference: whilst the bony substance formed, in layers, from without inward, the enamel is formed from within outward.

As the teeth become ossified the membranous partitions which, at first, simply separated the dental sacs from each other, are, also, changed into bone, and, growing more rapidly than the teeth, soon enclose them in distinct cavities. Besides the gum which, before, constituted the only coverings of the sacs, there is now a thick cartilage and a bony roof above them. This gives to the gums of the infant that degree of firmness which enables them to protect the forming teeth from external injuries.



At that stage of development, when the crown of the tooth is ossified, and the enamel deposited upon it, the sockets become deeper, the germ lengthens, becomes more narrow, and begins to assume the form of the root. This is shown in

FIG. 17.



Around the narrowing germ, as the whole body of the rudimentary tooth continues to rise, the bone is deposited ring after ring toward the bottom of the socket, and layer after layer internally, as in the crown. The cavity now becomes incapable of containing the growing tooth, any longer, and the bony roof above it, by a preparatory process of absorption, gives way. Freed from this obstacle, there is nothing left to oppose its passage but the thick cartilage mentioned above, and the gum; but the resistance offered by these structures is generally more formidable than that of the bony socket itself. Up to this time the growth of the tooth has progressed without causing the slightest degree of uneasiness, but the irritation now produced by the pressure of the rising tooth against the gum, and the reaction which takes place upon the highly organized pulp and the surrounding membranes, rarely fail to produce more or less inflammation and its consequences. The child now becomes fretful, shows a disposition to carry everything it gets into its hands to the mouth, and, under the most favorable circumstances, gives evidence from time to time, that it is suffering pain. There is generally slight

fever, sleep is disturbed and of short duration, the secretion of saliva becomes more abundant, and the color of the cheeks is heightened. We have seen cases in which well-defined bright red spots always appeared on the cheeks at the time when a tooth was making its way through the gums. If the mouth be examined at this time, it will be found that the gum is much more reddened and swollen at the place where the tooth is attempting to make its way out, than at any other part. In a short time, if nothing occurs to retard the progress of the tooth, the gum loses this inflamed appearance, and becomes white and transparent. The tooth is then soon seen making its way through a small opening, which gradually enlarges till the whole surface of the cutting edge is exposed. From this time all the unusual symptoms cease, and the tooth attains to its full size without giving any further trouble; but as all the teeth are subject to the same laws, all, of course, may produce similar disorder. It is found, however, all circumstances being alike, that the canine and molar teeth give rise to most pain.

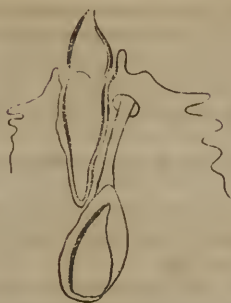
FIG. 18.



When the crown of the tooth first makes its appearance in the mouth, the root is not completed; and, as ring after ring of bone is formed toward the bottom of the socket, the crown continues to rise until the tooth has attained to its full size. At this time a bony wall separates the permanent from the temporary teeth, forming for each set distinct cavities. They are connected, however, by a prolongation of the sac of the permanent tooth; this prolongation forms a chord which passes through a small hole just on the inner edge of the socket of the latter, and attaches itself to the temporary tooth at the place of union between the crown and root.



FIG. 19.



In this drawing the relative position of the two teeth, at the time when that of the first set is completed, and the connecting chord passing through the bony socket, are shown. The use of this chord seems to be to sustain the new germ in its proper position, and to direct its course as its development progresses. It will be at once seen that, in consequence of this connexion, a too early extraction of the temporary teeth must, in some degree, disturb the growth and advancement of those of the second set; and should, except in cases where it is required by necessity, and this does not so often present itself as is sometimes supposed, be avoided. There are other very important reasons which, in their proper place, will be pointed out, why this pernicious practice should not be allowed.

The foregoing, as we have already indicated, is an account of the growth of one of the lower incisor teeth; in the same manner, precisely, are all the rest of the teeth developed. The description, it is hoped, is sufficiently plain to become, by the exercise of a little attention, intelligible to every one. The importance of the information it conveys will presently become more apparent.

The teeth of the infant commonly begin to make their

way through the gums at from the fifth to the eighth month after birth; sometimes, however, without seeming to be at all influenced by the state of the child's health, they appear at an earlier or later period. There is much uncertainty about the exact time at which the temporary teeth are cut, but there is little with regard to the order in which they appear.

The common order and time of their eruption is as follows:

First.—The central incisors of the lower jaw, followed by those of the upper jaw; at a period varying from the fifth to the eighth month.

Second.—The lateral incisors of the lower jaw, followed in a short time, by those of the upper jaw; at from the seventh to the tenth month.

Third.—The first molars of the lower jaw, then those of the upper jaw; at from the twelfth to the sixteenth month.

Fourth.—The upper canine teeth, followed by those of the lower jaw; from the fourteenth to the twentieth month.

Fifth.—The second molars of the lower, then those of the upper jaw; at about the second year.

The formation and eruption of these twenty teeth are called first dentition; they are designated, as we have already indicated, temporary teeth: because, in a few years, they become loose and fall out, to give place to those teeth which are destined to fill the jaws during life.

The account we have given of the circumstances attendant upon the last step, in the development of the teeth, their passage through the gum, is of those which occur, in ordinary cases, when the eruption of the teeth goes on uninterruptedly—but it is not always accomplished so easily. Dentition is frequently retarded, interrupted, and the symptoms we have mentioned greatly aggravated, by various causes. In such cases the disorder is not always confined to the mouth; the whole system is secondarily affected, and diseases of the most painful and distressing character are developed. A great many, perhaps the largest num-

ber, of the fatal diseases of infants, may be traced back, it is, with reason, believed, to the effects of difficult teething.

The first symptom, usually observed in cases of difficult dentition, and one which is frequently attributed to cholic, is a jerking back of the head of the infant, on attempting to take the breast, as if it were in pain. This is in consequence of the highly inflamed condition of the gums, which are now so sensitive that the lightest touch produces extreme pain. To this follow an increased flow of saliva; a gummy secretion from the corners of the eyes; itching of the nose; redness of one or both cheeks, changing, at times, from one to the other; rash; convulsive twitchings of the lips and muscles, generally; fever; constipation and diarrhœa;—this last, if gentle, may be regarded as a favorable symptom. An alarming difficulty of breathing, cough, painful inspiration, and, indeed, every symptom of pneumonia are many times present. The brain, too, is often affected; the pupils of the eyes are permanently dilated, the head is continually moved to and fro, with an uneasy and restless motion, accompanied with an incessant moaning, to which convulsions and death, unless relief be obtained, frequently ensue.

In too many instances, we have reason to believe; the causes which give rise to these distressing symptoms are overlooked, and remedies for constitutional disorder administered, when the most simple local treatment is indicated. We do not mean to imply that, in cases where these symptoms are known to be the effects of difficult dentition, that the general condition of the system should be neglected; but that the treatment should be directed with a rational reference to the first causes of the constitutional derangement. One of our principal reasons in bringing out this subject in so strong a light, is to endeavor to put aside an ill-founded prejudice existing in the minds of a great many persons, to a simple and efficacious method of removing the obstacles which, in most cases, give rise to such dangerous disorder. We mean lancing the gums. Some, in-

stead of adopting this measure which, when properly performed, causes little or no pain, mercifully resort to the barbarous method of frictions, with hard substances, upon the highly inflamed and now extremely sensitive tissue of the gums. Others, believing that nature is always enabled to effect her purposes in good time, reject all artificial assistance; but this doctrine, as applied to the human species, at least, is not, it is well known, universally valid. Others, again, think it better to avoid making an incision through the gum, under the impression that if it heal up again, the cicatrix will present a more formidable obstacle than the gum, itself, before the division was made. This objection, however, does not hold good; for, if the incision be properly made, the tooth will, in most cases, so far protrude before a union can take place as to prevent this result; and even if a union should take place, it is well known by those who have observed the matter closely, that the tissue of a cicatrix is less highly organized, less dense, and consequently more easily acted upon by the absorbent vessels. But even if it be found necessary to repeat the operation several times, in the same case, the bleeding which ensues will, to some extent, reduce the local inflammation, and in this manner afford temporary relief. A case was once related to us, by a distinguished and observant dental surgeon, which illustrates very strongly, the efficacy, in some cases, of this simple operation. He had observed, he said, a negro girl, for a number of fine spring afternoons, carrying a child along the street, past his office window, for the purpose, apparently, of giving it the benefit of the fresh air. He was struck with the sickly, emaciated appearance of the child, called the girl up to his window, and enquired the cause of its condition. She told him that it had been sick for several months, but that it was not known, exactly, what was the cause of its illness. Out of curiosity he took the child in his arms, examined its mouth, and, immediately, told the girl to go home, and tell her mistress that the child's teeth

were the cause of its illness, and that it could be certainly and speedily relieved. The mother was, at first, disposed to doubt the possibility of the alleged cause of the child's disordered condition, but, upon a little reflection, determined that she would at least call and hear the reasons of the gentleman, who had sent the message, for having come to this conclusion. He succeeded in convincing her of the probability of what he had stated, and was allowed to divide the gums, freely, over several teeth which had been vainly endeavoring to make their way through the gum. The relief experienced was almost instantaneous, and the child rapidly recovered its health. Cases of this kind are by no means of rare occurrence, and many might be cited, if it were necessary, but the indication seems so rational, that we can scarcely suppose that any one, who has studied and properly considered the condition of the teeth and gums at this stage of development, will need anything more to convince themselves of its efficacy. Every mother should make herself well acquainted with the usual time and order in which the teeth make their appearance, and frequently examine the mouth of the infant at the period when they are expected. If, at such time, she is led to believe, from the presence of any of the symptoms, above pointed out, that difficulty is to be apprehended, and on examining the mouth she finds the gums above the expected teeth much swollen and inflamed, they should be freely divided. In almost all cases a timely resort to this simple method of relief will prevent painful, and, perhaps, fatal consequences.

It will always be better, if the services of a physician or dentist can be procured, to submit the operation into his hands; but if access cannot be had to either it may be performed by any one having a steady hand, with the blade of a sharp penknife. The incision should always be carried down till the instrument touches the rising tooth, and it will be found that this produces no more pain than a simple scratch of the gum. An incision along the gum

will rarely, however, be found sufficient, and to effect the desired purpose, a second one should be made across the first. Care must be taken to direct the blade of the instrument toward the external face of the tooth, in order to avoid severing the chord already described. If the incision made in this manner should heal, and much inflammation and irritation remain, it should be repeated. This simple operation will be found much less painful than the mere touch of the finger to the gums, in their inflamed and sensitive condition.

The general remedies, in cases where the advice of a physician cannot be obtained, should be directed so as to diminish the determination of blood to the head. This may be effected by the administration of medicines which act gently upon the bowels, if there is no diarrhœa, bathing the lower extremities in warm water, in which may be thrown a little mustard, &c. In ordinary cases, however, the symptoms will, generally, yield to the simple remedy just indicated.

A great deal more might be said, with advantage, upon this subject, and we are very conscious of the meagerness of our remarks, but, in a work of this nature, very general views only can be taken, and very general directions, for any course of treatment, given. It is not the intention of the author to attempt to substitute it for the services of either the physician or dentist, but simply to give information which will assist practitioners of both professions, so far as lies within his province, by giving force to their advice; and to afford to patients some means of relief when the services of these cannot be obtained or relied upon.



## CHAPTER III.

### SECOND DENTITION.

Formation of the permanent teeth—Relative position of the two sets of teeth at the time when the first is completed—The connexion between them—Shedding of the temporary teeth—First four permanent molar teeth cut before those of the first set are shed—Great importance of this fact—Adult molar teeth never preceded, like the rest, by others—Periods at which the permanent teeth make their appearance—Third set of teeth—Irregularity of the permanent teeth—Measures to be taken for its prevention—Temporary teeth not often to be extracted for this purpose—Methods of correcting irregularity of the permanent teeth.

IN describing the structure, the classification and arrangement of the teeth, which was necessary before the reader could comprehend, clearly, what was to follow with regard to the manner of their formation, we took up, for examination, those of the adult. After having done this, we turned to the temporary teeth, and followed them, in all their stages of development, from the first moment their germs become perceptible, up to the period when they are completely formed. In this account we alluded to the permanent teeth for the purpose, only, of showing the manner in which they are seemingly produced by those of the temporary set, and to point out the intimate connection which exists between the two sets after the first is completed; but, as they merit more particular attention, we will now return to them.

The germs of the permanent teeth, as may be seen by reference to the figures illustrative of the description in chapter second, make their appearance almost as soon as those of the first set. The sacs in which they are formed are, at first, nothing but simple folds of the mucous membrane, of the mouth, coming off from the sacs containing



the temporary germs. By the same process, already mentioned, which takes place in the formation of the temporary teeth, the sacs are soon closed by membranous coverings. From their situation, above the sacs of the temporary teeth, they soon fall, as the jaws increase in depth and capacity, within and below them. The connexion existing between the two sets of teeth has been already particularly described. In the sacs or bags above designated, the permanent teeth are formed precisely in the same manner as the temporary teeth.

In Fig. 19 the relative position of the two sets of teeth, soon after the first is completed, is shown.

FIG. 20.



This drawing represents the left half of the lower jaw, from which the inner plates, of the bony sockets of the teeth, have been removed. It will be seen that the rudiments of the permanent incisor and canine teeth, now considerably advanced, are placed against the inner sides of the roots of the temporary teeth of the same classes. The teeth destined to succeed the temporary molars, already described as the bicuspid, are situated immediately below

these teeth, by the roots of which they are embraced. The chords connecting the two sets are also shown. The arteries, too, are seen entering the opening, mentioned in describing the jaw, and giving off branches to the teeth. Besides the rudiments of the five teeth, which are to succeed this part of the temporary set, two others, toward the back part of the jaw, will be observed; these are the first and second large grinding teeth of the adult. The germ of the wisdom tooth, which makes its appearance through the gum about the eighteenth or twentieth year, has at this time become perceptible, although not shown in the drawing.

The necessity for this second set of teeth arises from the unavoidably slender and delicate structure of the jaws, of the infant, which renders them incapable of giving place and support to a set sufficiently large and strong to serve the adult. But whilst the jaws, of the child, are incapable of receiving the whole number of teeth, required by the adult, such are provided as will best answer the purposes of mastication at that period of life; thus, next to the incisor teeth, come the large molars. These are succeeded by the bicuspid, or small grinders, of the adult—a class of teeth which seem more useful in preserving the strength of the dental arch, and of giving to the large molar teeth greater power, by throwing them farther back toward the fulcrum of the lever represented by the jaw, than to afford any very material assistance in mastication. It has been suggested, too, that a greater number of large grinding teeth would impede rather than assist mastication, and would interfere with the distinct articulation of sounds.

The permanent incisor and canine teeth occupy a much greater space in the jaws than those of the same classes which precede them; but this excess in size is nearly, if not quite, compensated for by the lesser size of the bicuspid than the temporary molars. More will presently be said of the occasional consequences of this disparity of size between the two sets of teeth.

As the permanent teeth progress toward full development, the roots of those of the first set are gradually destroyed, until they have no longer any attachment to the jaw. They, then, in an order corresponding to that of their formation, fall out to give place to the permanent teeth. This shedding of the temporary teeth, as it is called, usually commences at a period varying from the fifth to the seventh year, and is completed in about seven years.

Just before the time when the shedding of the temporary teeth commences, if the mouth of the child be examined, four new molar teeth, one on each side of both jaws, back of the temporary teeth, will be found to have made their appearance. These are the first permanent molars; but they are so often confounded with the temporary teeth that, under the impression that, like the latter, their loss will be supplied, they are frequently allowed to decay without any effort being made to preserve them. It is of very great importance that these teeth should be distinguished from the temporary set, and carefully watched from the first moment they make their appearance; for, as the mouth, at this period, is generally filled with the dead and decaying teeth of the first set, the greatest attention and cleanliness are necessary to preserve them in a healthy condition. Upon the very first signs of decay exhibited by them, which, in another part of this treatise will be minutely described, if it make its appearance, in spite of the efforts used to prevent an attack of this disease, no time should be lost in resorting to the proper means of arresting it; for, at this time, it will progress with great rapidity, and the teeth would be inevitably lost in a very short time. There will not be the slightest difficulty, in distinguishing these teeth, when the fact is recalled that there are but twenty temporary teeth, and that every one, above this number, belong to the permanent set. The presence of these teeth may be determined, too, by remembering that those of the temporary set have all made their appearance

in ordinary cases, before the third year, and that all the new teeth, which appear after this period, are of the permanent set. We have always found the greatest difficulty in convincing parents, when operations upon these teeth have become necessary at a very early age, that, if extracted, they would not be renewed; for it is the general impression that all the adult teeth have been preceded by others. We press this matter strongly, because professional experience has shown us, so constantly, the bad effects of this erroneous impression. The statement, although strictly true, seems scarcely credible, that nine individuals out of ten, in whom exist the ordinary predisposition to decay, of the teeth, lose the first permanent molars at an early age, unless the greatest attention to the health of the mouth has been observed. Some may be disposed to regard the loss of two or three teeth as a matter of too trifling importance to occupy so much attention; but when it is remembered that, with the loss of each, mastication is less perfectly accomplished, and the healthy functions are, in the same proportion, liable to be disturbed, it is seen to be a subject worthy of the most serious consideration. And, with regard to parents, how much soever, they may be disposed to be careless about the preservation of their own health, it should be kept in mind that the care of that of their children, in early life, is a religious duty, and one which they cannot innocently neglect.

About the fifth year the two lower central incisors become loose and fall out. In a short time the two permanent central incisors will be seen to rise in their places, but as they are larger than those which preceded them, the adjoining lateral incisors give way in order to afford them sufficient room. When the permanent lateral incisors come up, the temporary canine teeth are, in like manner, removed, to afford a place for them. These four teeth occupy as much space in the jaw as was taken up by the four temporary incisors and one of the canine teeth; consequently, if the canine teeth were to rise at this period.

they would occupy a place without the range of the arch formed by the other teeth. The next teeth shed are the first molars, followed soon after by the second, and, as these teeth are succeeded by the bicuspid, which are smaller in size, enough room is gained for the canine teeth, which are then enabled to take their proper places in the dental arch. This is the natural course in which the permanent teeth succeed the first set; but, sometimes, the change is not effected so perfectly, and it is necessary to take great precautions to prevent unsightly and injurious irregularities. This subject, which is one of very great importance, will be presently considered.

In this chapter we have, thus far, with the exception of the first molar, which was incidentally considered, treated of those teeth only of the permanent set, which replace the temporary teeth. As the child, however, has but twenty teeth, and the adult thirty-two, it follows that twelve must be primitively permanent. These embrace all the large grinding teeth of the adult.

In describing the growth of the teeth we pointed out the manner in which the germ, of the permanent tooth, was formed in a fold of the mucous membrane, which comes off, like a shoot, from the sac containing the temporary germ. The first permanent molar is formed independently, like the temporary teeth; and, like them, gives off an appendage of its sac, in which the germ of the second molar is formed. The latter, in like manner, gives origin to the third molar or wisdom tooth. They are all subsequently developed like the rest of the teeth.

The order and time of the appearance of the permanent teeth are, commonly, the following:

First molars, from the fifth to the sixth year.

Central incisors, from the sixth to the eighth year.

Lateral incisors, from the seventh to the ninth year.

First bicuspid, from the ninth to the tenth year.

Second bicuspid, from the tenth to the eleventh year.

Cuspids, from the eleventh to the twelfth year.

Second molars, from the twelfth to the fourteenth year.



Third molars, or wisdom teeth, from the eighteenth to the twenty-fifth year.

This order, however, like that in which the first teeth are cut, is liable to great variations.

Some mention has been made, by various writers, upon dental surgery, of the appearance of a third set of teeth, at an advanced period of life; but there are no well-authenticated instances on record of a second renewal of all the teeth. There are, however, a few cases, mentioned by credible authority, of the appearance of one or two new teeth late in life, which, from their situation in the jaws, must necessarily have been of this description. In most of the cases related, the teeth which made their appearance at so late a period were, in all probability, of the second set, the growth of which, from some cause, had been retarded or suspended. This, however, is a question of little practical importance, as these teeth, appearing as they usually do, when there are no others to support them, far from being useful are such a source of irritation, that their removal becomes necessary almost as soon as they show themselves.

We have pointed out the circumstances attendant upon a natural and orderly change of the teeth; but this change, as we have already intimated, is not always accomplished with so much regularity; it may, from various causes, be disturbed. The secondary teeth may be diverted from their natural course in various ways, and much irregularity in their arrangement produced. As the order and time, of the shedding of the teeth, are now fresh in the memory of the reader, this seems to be the most proper place to introduce such directions, for the management of second dentition, as will, if put into practice, prevent these irregularities, and their injurious consequences.

At the time when the temporary teeth are about to be shed, the mouth of the child should be frequently and carefully examined, and, as the front teeth are generally the subjects of irregularity, this attention should be particularly directed to them. As long as there are no signs of

the coming of the second set, the first teeth should be allowed to remain undisturbed, but the moment the cutting edges of the central incisors are seen piercing the gum, either on the outside or inside of the alveolar arch, the two temporary incisors, if they are still remaining, should, without delay, be extracted. A little time should now be allowed to elapse, and, when the central incisors rise in their sockets, if there is not sufficient room, the two temporary lateral incisors, if they still remain, should be removed. The permanent central incisors, if no other obstacle is present, will now take their proper places, but as soon as the lateral incisors appear, the canine teeth, if there is not room, must, in like manner, be removed. After this it will rarely be necessary to extract any more of the temporary teeth for the purpose of preventing irregularity, and it will, generally, be found that if there is still a want of room in the jaw, that the canine teeth, which come last, will be thrown out of the arch. The method of correcting this irregularity will be presently shown. In cases, however, where the permanent canine teeth make their appearance before the temporary molar teeth are shed, and these do sometimes present themselves, it will be found necessary to extract the latter to give room.

We must here take occasion to deprecate an injurious custom which had its origin in a most strangely founded popular prejudice, but which, at present, has, we are glad to believe, passed almost entirely out of use. To some extent, however, it is still practiced. It was, for a long time, the opinion of a large part of the community, (and it conflicts, strangely, with their ideas of the efficiency of nature in some of her other operations,) that, if the teeth of the first set are allowed to fall out, naturally, those of the second set will be irregular when they make their appearance. It became necessary, consequently, to force the poor child to a dentist, before the first teeth were even loosened, and have them dragged out, regardless of the pain inflicted, for the purpose of insuring a regular set of teeth



in after life. If there were no other objection to the extraction of the first teeth, at this time, than that it is the infliction of unnecessary pain, that would be sufficient to condemn it; but, instead of preventing, it will cause future irregularity of the second teeth. If these teeth are removed before the second teeth are ready to come up, a permanent contraction of the jaw will take place, and, as there will not be sufficient room for the second teeth, when they do appear, they must be more or less crowded together. It must not be supposed that this is mere theory, (although as theory, it is in perfect accordance with what might, under such circumstances, be expected to take place); experience has proved, in a great number of instances, that it is an invariable result. Besides this, a too early extraction of the temporary teeth, by breaking up the connection between the two sets, may so disturb the growth of the permanent teeth as to stop their further development, or to divert them from their natural course.

The first teeth should never be extracted except when it is found that they are in the way of those of the second set, or when they are so much diseased as to affect injuriously the surrounding gums and sockets. When toothache occurs, it may be readily and permanently relieved by the preparation which will be indicated when we come to treat of diseases of the permanent teeth.

But, although the second teeth may have taken the most irregular positions in the jaws, the deformity is not beyond the reach of remedy.

Irregularities of the teeth may proceed, amongst others, from three principal causes: 1st. The presence of a greater number of teeth in the mouth than is natural; 2d. A deficiency of space in the jaws; and 3d, a wrong direction given to one or more at the time they make their appearance.

1st. The presence of supernumerary teeth, although not of very common occurrence, is a more or less frequent cause of irregularity. The degree of irregularity may be

confined to that produced simply by their presence near the regular dental arch, or they may displace some of the rest of the teeth. They are, generally, formed near the front of the mouth, most commonly on the inside of the upper jaw, but are sometimes found as far back as the wisdom teeth. They are usually isolated, but cases are recorded of duplicates of all the incisors of the lower jaw. The crowns of these teeth are, generally, of an irregular conical form; they have short, crooked roots. Wherever they are present, they should, without hesitation, be extracted. Great caution should be observed, however, to be certain that teeth, irregularly situated, belonging to the natural set, are not taken for supernumerary teeth. This may always be determined, when they occupy the front part of the mouth, by examining whether the ordinary number of incisors and canine teeth are present. Any irregularity which they may have produced in the arrangement of the rest of the teeth, must be corrected in the manner presently to be shown.

2d. The second cause of irregularity, a deficiency of space in the jaws for all the teeth, is of most common occurrence. This may arise from a contraction of the jaws, in consequence of the too early extraction of the temporary teeth; from some original malformation of the jaws; or from a great excess in size of the second over the first teeth.

It would be impossible to enumerate the variety of unsightly irregularities dependant upon this cause; it may be useful, however, to mention some of the most common. The whole of the upper incisor teeth may project in such a manner as to throw out the lip considerably, and display their cutting edges, when the mouth is opened. One or more may be thrown out of the dental arch, which will be nearly or entirely filled without them; this is a very common form of irregularity of the canine teeth. The whole of the front teeth, of both jaws, may be so much crowded together that the crowns will deviate, in almost every

direction, from a regular position : cases frequently occur in which the lateral surfaces of the incisor teeth present towards the lip. The lower incisor teeth may project beyond the range of those of the upper jaw, instead of closing within them, as they do naturally. But the varieties which occur are, as we have already said, innumerable.

The principle upon which irregularities of this kind are corrected is, however, the same in all cases. The first indication is, to obtain the necessary space to allow the irregular teeth to come into the arch ; and then, by means of various mechanical appliances, to press them into their proper places. Directions for moving the teeth, after they have become fixed in their sockets, will strike those, who have not thought of the subject, very strangely, and they may be disposed to think that it cannot be done without more or less injury. But, up to the age of sixteen years, and even after that period, in some cases, it may be done to considerable extent with ease and safety.

The necessary space required for the correction of irregularities of this kind is generally obtained by the removal of one or more of the teeth, even though they should be perfectly sound. In the extraction of teeth, for this purpose, and we now suppose that all the second teeth, with the exception of the last molars, have made their appearance, the bicuspid, as being the least important, should be chosen, unless some of the teeth near them are so much decayed that their preservation is impossible. Generally, the second should be taken instead of the first, but this will depend, entirely, upon the circumstances attendant upon each particular case. The cuspid is, perhaps, more subject to irregularity than any of the rest of the teeth, in consequence of the manner in which they are thrown out of the arch, whilst the bicuspid is taking the place of the temporary molars ; for it sometimes happens that the arch is almost entirely filled up before they make their appearance. These teeth should never be extracted, when they are in such a situation that, by removing the adjoining or

second bicuspid, they can be pressed into their proper places; and the instances are rare, if, indeed, they ever occur, in which this cannot be done. It is, also, very improper to extract any of the incisor teeth, when they are much crowded, especially in young persons, as the loss of one of these teeth destroys the symmetry of the whole set, even if the space it occupied should entirely close up by the approximation of those adjoining.

It is frequently the case, when the irregularity is not very great, and there is no obstacle in the way of their return, that the irregular teeth, after the requisite space has been obtained, aided by the constant pressure exerted by the lips from the outside, and the tongue from the inside of the mouth, will soon fall into their proper places. This, however, does not always happen, and we are compelled to resort to mechanical fixtures for the purpose of obviating obstructions, and to move, gradually, the deviating organs into a regular position. We cannot do more than describe the means which would be used in one or two special cases; the apparatus must, of course, vary with them. This will serve, however, to show the manner in which the object is effected.

In a case where one of the lateral incisors is thrust out of the arch, toward the inside of the mouth, the central incisor and eye-tooth nearly touching, one of the bicuspid teeth, either the second or first, according to circumstances, must be extracted. After the place from which it was taken has healed, the eyetooth should be gradually moved back toward the remaining bicuspid, by inserting a thin wedge of paper between it and the irregular tooth, increasing it from day to day in thickness. It should be prevented from returning to its place by passing a ligature around it and the first grinding tooth. Although sufficient space will soon, in this manner, have been gained to afford room for the irregular tooth, it will, generally, be found to pass, when the mouth is closed, inside of the circle of the lower teeth. This, it will readily be seen, will be an in-

superable obstacle to its coming forward, if left to itself, for the constant tendency of the lower teeth, every time they strike, is to press it inward. The usual method of removing this difficulty, and of bringing the irregular tooth into its place, is to attach a bar of gold or silver to one of the first grinding teeth, on each side, and bring it forward in front of the incisors. At the place opposite the deviating tooth two holes are drilled, through which a ligature is passed, fixed around the tooth and drawn firmly. To prevent the teeth of the lower jaw from striking against the irregular tooth, a gold cap is fitted upon one of the molars, which will not allow the jaws to come quite together. The ligature is drawn tight, every day, until the tooth is moved sufficiently forward to strike on the outer surface of those of the lower jaw; at which time the whole apparatus may be removed, without fear that the tooth will fall back into its old position. This special case will serve to show the application of the principles upon which the correction of irregularities is founded; in the same manner those of the most unsightly description may be remedied.

It may be well to state that few cases of irregularity of the incisor teeth occur, in which the extraction of a bicuspid tooth, of one side of the mouth, will be sufficient. By this, in many instances, the desired space may be obtained, but the tendency of the whole of the teeth, if the jaw be full, will be toward the vacant space, and it is easy to perceive that this would produce a deformity almost, if not quite, as bad as that caused by the irregular teeth. But many cases occur in which it will be unnecessary to extract any of the teeth, all that is required being merely an apparatus fixed so as throw out the whole of the teeth; thus giving the arch greater compass to admit the irregular teeth.

3d. The third cause of irregularity of the teeth is, as we have said, an improper direction given to them at the time they make their appearance; this may be confined to

one or more, or may affect the whole of the incisor teeth of either or both jaws. In the case we have instanced above, of the irregular lateral incisor, it is seen that even after sufficient room was obtained by the extraction of one of the bicuspid, that it could not come forward, in consequence of the obstacle presented by the teeth of the lower jaw. In precisely the same manner may one or more of the upper incisors come out back of their regular place in the arch of the jaw, in consequence of the too long retention of the temporary teeth, or other causes, and be unable to come forward, even after the obstacles which first presented themselves, have been removed—because, at every occlusion of the jaws, the teeth of the lower jaw strike against their external edges. This irregularity, which is a very serious one, (for as the compass of the mouth is much reduced, indistinctness of articulation is caused,) is corrected by attaching to the lower teeth plates of metal, so inclined as to strike against the inner surfaces of the upper teeth, thus constantly pressing the former inward at the same time that they force the latter outward. In this case, as in the other mentioned, the jaws must be kept from closing entirely, by the use of a gold cap fitted to a molar tooth.

The above account of the manner in which irregularities of the teeth are to be prevented or remedied, is, necessarily, very brief and general. The great variety of cases which occur, render necessary much experience and judgment on the part of the dentist. The utility of most of what has been said, in this chapter, consists in pointing out to parents what ought to be done at the time this change is taking place, and what ought to be avoided. It will, also, serve to show the necessity of being well assured of the qualifications of the practitioner into whose hands they entrust their children, for it will be seen that injudicious management at this time, if it do not cause irreparable injury, will, subsequently, occasion much trouble.



## CHAPTER IV.

### DECAY OF THE TEETH.

Importance of some knowledge of the anatomy of the teeth and mouth—Decay of the teeth—Its occasional consequences—Description of decay—Its insidious progress—Exposure of the nerve—Tooth-ache; its causes and consequences—Necessity of inquiring into the causes of disease—Causes of decay of the teeth—Predisposing and exciting causes—Predisposing causes of decay—Dependant upon hereditary transmission—Local or constitutional disorder at the time the teeth were forming—Defective structure of the teeth—Irregularity—Improper operations—Use of acids, and dentrifices acting mechanically—An exciting cause necessary to the development of decay—This exciting cause the fluids of the mouth in a disordered condition—Causes tending to vitiate the fluids of the mouth—Constitutional disorder—Sedentary and indolent habits—Any course of life producing derangement of the digestive functions—Artificial teeth improperly inserted—Reasons why the teeth decay more rapidly now than formerly.

AN account of the diseases to which the teeth and their surrounding structures are subject, and the prevention and treatment of these diseases, is the principal object of this little work. The preceding chapters are, however, a necessary introduction to a consideration of these disorders, and must be read with attention, before that which follows can become at all interesting or intelligible. It is, for instance, impossible to obtain any clear idea of the manner in which decay attacks and progresses in a tooth, if the structure of the tooth, and the relative situation of the parts, which compose it, be not previously known. It will be seen, too, as we proceed, that, without an acquaintance with the manner in which the teeth are placed in the jaws, and their relation to other parts, many diseases, to which, in a disordered condition, they give origin, would have been inexplicable. It is presumed, however, that no further reasons need be urged why the reader should examine that which may, at first, seem to him unimportant.



What is known as decay of the teeth, is not only the most common disease to which these organs are subject, but it is one which gives rise to most others that affect them. To this source, too, trifling and easily controlled as it is, in its commencement, may be traced a great many of the disorders of the gums, the jaws, and their processes, which come under the care of the dental surgeon; and, indeed, many of those frightful affections of the face, which require the most terrible operations for their removal, and which are often beyond the remedy of art.

This disease commences in the external, and proceeds toward the internal parts of the teeth, first attacking the enamel, and then the bone. It sometimes first makes its appearance as an opaque whitish spot, upon the smooth surface of the enamel, with the fine, life-like, semi-transparent hue of which, it presents a strong contrast. When the disease has progressed so far as to have made its way through the enamel, and attack the bony portion, of the tooth, this part also undergoes a change of color, and a dark brown or black spot indicates the position and extent of the decay. This very perceptible change of color, in the bony portion of the tooth, does not, however, always follow the attack of disease; the decayed portion of the bone sometimes differs in color, from that which surrounds it, only in being whiter; this variety of decay is of the most destructive kind, frequently resisting all the ordinary efforts to arrest it.

Sometimes, and this is especially the case with the molar teeth, decay first makes its appearance as a small dark crack in the enamel. The destructive agent has passed through the enamel in consequence of some slight defect in this covering, and attacked the bony structure. As decomposition goes on more rapidly, when it affects the bony structure, than it does before it has passed through the enamel, a cavity, of considerable size, is frequently made underneath this covering, before the patient is aware of it, and which, much to his surprise, he disco-

vers when the thin wall of enamel is broken in. If no effort is made to arrest the disease, the destruction of the tooth goes rapidly on, tending towards the internal cavity. When it has progressed so far as to make an opening into this cavity, the body we have already described as the pulp, deprived of its natural covering, becomes exposed to the action of the atmosphere, and the pressure of extraneous substances. As it is extremely delicate in structure, these causes produce more or less irritation; there is an increased flow of blood to the part which, having no room, in its narrow, rigid cavity, for the expansion, which always takes place in an inflamed body, becomes strongly compressed, and, as the nervous excitability is, under such circumstances, greatly exalted, the most excruciating pain is developed. This effect of the exposure of the pulp, or "nerve," as it is commonly called, of the tooth is, unfortunately, of such common occurrence, for few have reached the adult age without having experienced the pangs of tooth-ache, that a description of it is unnecessary. The pain, thus produced, generally continues with more or less violence, for two or three days, and then subsides, but is developed, anew, upon every fresh accession of cold, or every time any substance is forced down into the cavity of the tooth. The tooth-ache recurs, from time to time, until the pulp itself is entirely destroyed by suppuration, which, sooner or later, always takes place. From this time pain ceases, but decomposition of the crown goes on more rapidly, and it soon crumbles away, leaving nothing but the root. The progress of the disease seems, at this stage, to be somewhat retarded, but it still goes gradually on, till the whole of the root is removed. After the loss of the crown, the exposed parts of the roots gradually decay, and just in the same proportion are the sockets filled up by a deposition of bone, by which they are pushed outward.

The above is an account of the manner in which decay of the teeth usually presents itself, and progresses till the affected tooth is destroyed. In some cases, however, no tooth-ache

is experienced, the teeth crumbling away without producing any other inconvenience than their loss. Sometimes, on the contrary, after tooth-ache is once developed, it never subsides, until the destruction of the pulp is effected; continuing, in such cases, when the patient has not been able to summon sufficient courage to submit to its extraction, or to find any other means of relief, uninterruptedly, for two or three weeks.

The questions are frequently asked—Why is it that the teeth decay? Why do all the members of particular families have bad teeth? Why is it that some of the members of a family have sound teeth, whilst those of the others are much decayed—the same attention in both cases being paid to their preservation?

These are important and interesting questions; for a knowledge of the causes which produce disease is necessary before it can be prevented, or, when once developed, successfully treated. But the dentist, however well he may be informed with regard to the subject, finds it almost impossible to make any intelligible reply to them, without entering into details, to which few who ask the questions have the patience to listen: for an answer involves a description of the structure, and a history of the development of the teeth. To those, however, who have gone attentively with us, thus far, a satisfactory reply can be made.

The causes which operate in the production of decay of the teeth, like those in most diseases, may be classed under two general heads: 1. Predisposing; and 2. Exciting causes. As the distinction, between these two series of causes, is an important one, we will attempt to convey to the minds of such of our readers as may not be already informed upon the subject, a clear idea of what is meant by these terms, as applied to the teeth. The teeth are said to be predisposed to decay, when, from any cause, (such as an original defect in their structure, the injury or removal, subsequent to their formation, of any portion of their covering of enamel, their position in the jaws, &c.) they are ren-

dered more liable to be acted upon by those destructive agents which, in a greater or less degree, are present in the mouth of every individual. The agents by which the teeth, thus predisposed, are destroyed, are termed the exciting causes.

The principal predisposing cause, of decay of the teeth, is dependant upon some defect in their structure. This defective structure may be owing to a deficiency of those materials which give them density: (for, it is found that, just in proportion as the teeth are firm and close in their structure, they are enabled to resist the action of that agent, presently to be pointed out, which produces decay,) or it may be owing to a partial defect in the enamel by which the bony substance is covered. This defective structure may be either a consequence of hereditary transmission, or the effect of constitutional or local disorder at the time when the teeth are forming; or it may be owing to some injury inflicted subsequent to their formation.

The transmission of teeth, defective in structure, from parent to child, is precisely analagous to the transmission of the forms of pulmonary consumption, and all hereditary diseases. It is a fact as commonly observed in the one case as in the other; and we, by no means unfrequently, hear it remarked that certain persons inherit bad teeth from one or the other of their parents. Where a hereditary predisposition exists, it usually affects the whole of the teeth, as the organs by which they are formed seem to be naturally incapable of fulfilling, perfectly, their functions. It is, sometimes, however, confined to a portion of the whole set, and even to a particular tooth. We have heard of a family in which, through three generations, one of the incisor teeth, of every individual, was decayed on the outer surface, near the gum, whilst the rest remained perfectly sound.

Constitutional disorder, at any period before the adult age, must, whilst it continues, retard, interrupt, and, in some degree, prevent the perfect development of every

part of the organism. But as almost every portion is, during life, constantly undergoing change, these effects are, in a great degree, transitory, passing away as soon as a healthy action is again established. The teeth, however, which undergo no change, after they are once completed, except a slight and slowly progressing increase of density, retain, during life, the impressions made upon them whilst they are in a forming state. All diseases, consequently, by which infants and young children are attacked, or the inordinate action of medicines, injudiciously administered, by lessening, for the time, the vital forces, prevent their perfect development, and implant in them a susceptibility to be affected by the action of the agents which produce decay; and this susceptibility remains through life. Predisposition, arising from this cause, without the disorder has been of long continuance, affect the teeth but partially. Those which were forming during the continuance of the disordered action, will be found readily to decay, and may be entirely destroyed, whilst those produced, when the functions were performed in a healthy manner, even though they be adjoining the former, will remain sound. This will account for the fact that the teeth, generally, decay, as they are formed, in pairs; that is, the teeth of the same classes on opposite sides of the mouth are, generally, found to decay simultaneously.

Any thing which affects the health of the mouth, whilst the second teeth are forming, will have a tendency to prevent their perfect development. Violent inflammation of the gums, during first dentition, will, in a greater or less degree, affect the teeth of the second set. A diseased condition of the mouth, in consequence of the effects of a number of decayed teeth of the first set, has a tendency to prevent the perfect development of the permanent teeth. This fact shows the necessity of particular attention to the preservation of the first teeth of children, which are too often neglected, and allowed to decay, because it is believed, as they are soon to be replaced by another and



more perfect set, that they are of little consequence. But it is rarely the case that the first teeth are diseased, to any considerable extent, without producing an injurious effect upon those which are to follow.

The removal of any part of the enamel, however trifling it may be, favors the action of the exciting causes of decay, although the body of the tooth may be of the firmest texture. This makes apparent the necessity of avoiding every thing which tends, in any manner, to injure this covering; the biting of very hard substances, or the use of metallic tooth-picks should, therefore, be avoided.

Irregularity of the teeth is a predisposing cause of decay. Where the teeth are much crowded together, the enamel on the surfaces, in contact, seems to become weakened by pressure, and to lose, in some measure, its ability to protect the bone which it covers. Irregularity, in their position, favors the retention of particles of food between the teeth; and although these particles of food, in a decomposed state, may not actually produce decay, they afford a vehicle for the destructive agent, and keep it in contact with those parts of the teeth upon which the enamel is thinnest.

Injudicious operations upon the teeth, such as improperly filing them, so as, after removing the enamel, to permit the spaces, made by the file, to close up; the use of acids for the removal of discolorations upon the teeth, by the action of which a greater or less portion of the enamel is removed upon every application; the use of mechanical dentrifices, which wear away this covering of the teeth, &c.

But the teeth of an individual may be of very soft structure, and yet remain sound and healthy during life: for the action of a chemical agent is necessary to produce the disease of which we are treating. Decay of the teeth, in its first stages, is caused by an agent which dissolves the lime forming their basis, in the same manner that bone is dissolved when exposed to the action of an acid. This agent has been demonstrated to be the fluids of the mouth, in a vitiated condition; for the mucous and salivary secretions,

harmless in a healthy state, become, under certain circumstances, highly corrosive in their nature.

The secretions of the mouth are liable to become vitiated under the following circumstances :

As a consequence of constitutional disorder, especially of a febrile or inflammatory character ;

Sedentary and indolent habits, an improper diet, intemperance ; in short, any course of life affecting the healthy action of the stomach, or producing derangement of the digestive functions, even if it should not be to so great an extent as to produce any visible constitutional effects, will produce this result ;

A diseased condition of the mouth, independently of any constitutional derangement ; this may be produced by inflammation of the gums, by the improper administration of medicines, the accumulation of tartar upon the teeth, decayed teeth, &c ;

Particles of food, retained in the interstices of the teeth, undergoing decomposition ;

Artificial teeth improperly attached to the other teeth, or placed upon metal subject to corrosion in the mouth ;

Diseased teeth filled with any substance unable to resist the action of the secretions.

When the secretions of the mouth become disordered in this manner, those teeth which are defective in structure from any of the causes above enumerated, are first attacked by decay. Their action, as we have already said, is at first, similar to that of an acid upon bone, (and under these circumstances analysis has shown that the fluids of the mouth assume an acid character,) and when decay attacks the enamel, which possesses a very low degree of vitality, its progress resembles that of chemical decomposition. It can scarcely be called disease. But after the enamel is penetrated, the bone, possessing a higher degree of vitality, becomes inflamed, the animal matter putrifies, and layer after layer of the bone dies, exciting in that which is contiguous inflammation and death, also, so that, although in its incep-



tion, the decay is caused, entirely, by external agents, the teeth have, then, within themselves, the elements of disease and destruction. Decay goes on much more rapidly from the combination of these two causes; but no matter how carefully the fluids of the mouth may be excluded from the decayed portion, the disease, after it once attacks the bone, unless it be entirely removed, will still progress, more slowly, it is true, but not the less surely.

A little reflection, upon these facts, will serve to explain the reason why diseases of the teeth are so much more prevalent at the present time than they were fifty years ago. The habits of the greater portion of the community were more simple then than now; they enjoyed better health, and, as a general rule, lived to greater age than the present generation. The fact that diseases of the teeth prevail to a greater extent now, than formerly, seems to be very puzzling to some old persons, who, instead of attributing it to the true and very apparent cause, put it all down to the increased attention which people pay to their teeth, and their frequent recourse to the great multitude of dentists who infest the land. It has been the lot of the author, on more than one occasion, to be employed in families where the children were anxious to avail themselves of all the means provided, by art, for the preservation of their teeth, but where the parents, imbued with these absurd notions, which no reasoning could remove, would look with suspicion and distrust upon all that was done, and frequently interfere so as to prevent the perfect and effectual performance of the operations. This may, indeed, in some cases, have arisen from an observation of the results which follow the imperfect performance of operations upon the teeth; in which cases more harm, perhaps, than good is done.

## CHAPTER V.

### TREATMENT OF DECAY OF THE TEETH.

Operations for the arrest of decay of the teeth—The use of the file—Sound teeth never to be filed for the prevention of decay—Of great importance after decay has begun—Proper time for making use of the file—Prompt action necessary—The operation useless if not thoroughly performed—Manner of performing it—Every vestige of decay to be removed—Great attention, on the part of the patient, necessary to preserve the teeth after this operation has been performed—Cases proving its efficacy when properly performed—After decay has advanced to any considerable extent, cannot be used with advantage—Filling—Preservation of decayed teeth, by means of the operation, in ordinary cases, *certain*—Reason of so many failures—Case—The sooner this operation is performed the more certain will be its success—Preparation for filling—Separation of the teeth, by pressing them apart—Conditions under which this can be done with advantage—Use of the file for this purpose—Manner of removing decay, and preparing the cavity for the plug—Tenderness of decayed teeth, and manner of removing it—Description of the operation of filling—Manner of destroying the nerves—The appearance which a well filled tooth should present—Material used for filling the teeth—Gold—Tin—Silver—Platinum—Gum mastic—Lead, &c.—Cements always useless for this purpose—Very pernicious effects of the *mineral cement* now in common use.

It is, generally, admitted, that most of the diseases to which the teeth and gums are subject, may be prevented by timely and well directed attention. As decay of the teeth is, generally, produced by, and complicated with, a disordered condition of the mouth, a consideration of preventive measures must be deferred till this has been more closely examined. We will now describe the operations by means of which this disease may be effectually and permanently arrested, after it is once developed. These operations are commonly known as filing and filling the teeth.

A very strong dislike has always prevailed, in the community to the use of the file, in operations upon the teeth, arising from the fact that, after any portion of the cover-

ing of enamel, is removed, they are more liable to decay. To a certain extent this dislike is well founded; the file should never be used upon the teeth, for any purpose, whilst they remain sound. It is often urged, as a pretext for the performance of this operation, that the teeth are too close together, and will decay if not separated; but such advice, coming from a dentist, should be sufficient to induce a withdrawal of any confidence which may have been placed in him, for it is indisputable evidence that he is unqualified to fill the important position he occupies.

But whilst this operation upon sound and healthy teeth should be deprecated, in the strongest manner, it is found to be, after decay has once commenced, a most valuable remedy. In the one case it is used for the prevention of disease, by the removal of a portion of the enamel and bony substance, which are in a perfectly healthy condition; in the other it is employed after a portion of the enamel is already destroyed, to arrest a disease which, if left undisturbed, must bring about the destruction of the affected teeth. In the first case, by a preventive operation, the teeth are rendered much more liable to decay than before they were touched. It is true that the teeth filed, under these circumstances, are not more liable, subsequently, to decay than those which have been operated upon, in the same manner, for the removal of disease. This is true, at least, if the separation is skilfully effected, but there is good reason to doubt the ability of any one to perform this operation well, who, under such circumstances, would perform it at all.

The only time at which the file can be used, with advantage, in the removal of decay, is, when the disease has first made its appearance, and before it has progressed so far as to form a cavity. It is applicable to the lateral surfaces, only, of the teeth. These being closely in contact, afford a place for the lodgment of alimentary substances, by which the fluids of the mouth are kept in contact with the teeth. If, from any cause, the mouth is in a disordered

condition, and a predisposition to decay exist, these parts will rarely escape. As soon as it is found that the teeth are beginning to decay, and to ascertain this it will sometimes require the nicest examination, on the part of the dentist, the file should be at once resorted to for the purpose of arresting it; and, when it is once determined upon to use this instrument, it should be used effectually. No temporizing course will answer here; for, if *every vestige* of the decay, even to the slightest discoloration of the bone, be not removed, and the filed surfaces left in such condition that they can ever afterward be kept clean, the progress of the disease will only be accelerated.

The manner of performing the operation is as follows: In operating upon the front teeth a thin file, made for the purpose, cutting on both sides, is passed between those which are affected, nearly up to the gum, but should not be allowed quite to touch it; in this manner little shoulders of bone will be left to prevent the spaces made from closing up. The lateral surfaces of the teeth will now be exposed, and, if the decayed portion be not entirely removed, a file, smooth on one side, should then be taken, and so directed as to cut away as much of the inner portion of the teeth as is necessary for the complete removal of the disease. This may be done without increasing the space first made. After every portion of the decay has been removed, by this means, (and, if the patient have not the utmost confidence in the operator, he should examine the teeth, himself, when their position will enable him to do so,) the filed surfaces should be rendered perfectly smooth by the use of a file, partially worn, powdered pumice stone, and a polished steel burnisher. On the bicuspid and molar teeth the same operation should be performed, in such a manner that the spaces made shall resemble a letter V, with the apex toward the gum.

Every person, upon whose teeth this operation has been performed, must be made distinctly to understand that their preservation now depends, in a great measure, upon him-

self. If he should neglect them the most skilful operation will be likely to fail. After being careful that they are separated in such a manner that the spaces made cannot close up again, (this is indispensable,) he should cleanse the teeth perfectly, three or four times a day, by passing between them a piece of raw cotton or floss silk.

Although a little reflection must satisfy every one of the efficacy of this operation, for by it disease is removed, and the teeth, with the care of the patient, freed from the influence of the exciting causes of decay, yet facts are always more conclusive than mere theory, however plausible it may be. Of these an abundant number come, daily, under the observation of every dentist. The following are from credible authority:\*

“Case I. October, 1833.—Called on us, for professional services, J. C. Forty years ago, the incisor teeth, of the upper jaw, being in a state of decay, were separated by a thin file, and the disease completely cut out, from their inner surfaces, by the celebrated Joseph Fox, of London. They have not decayed, in the least, since, nor would an observer suspect that they had been operated upon.

“Case II. November, 1834.—Examined the mouth of Mr. W. Two molars, three bicuspidati, one cuspidatus, and two incisors were filed, ten years ago, by Mr. Cartwright, of London, the most celebrated dentist in Europe. More than one-third of some of these teeth were filed away. The disease has not made any farther progress since the operation.

“Case III. November, 1834.—Plugged some teeth for Miss S. In 1827 the incisors, cuspidati, and some of the bicuspidi, being much decayed, were freely separated, and the disease cut away from their inner surfaces by the gentleman mentioned in case II. This case is remarkable, for nearly one-half the substance of the crowns of some of the teeth were cut away; the disease, notwithstanding,

\* They are taken from an excellent treatise, upon the teeth, published a few years since, by Dr. S. Spooner, of New York.

was cured, and the teeth are still sound, though much disfigured.

“Case IV. September, 1835.—Rendered professional aid to Col. C. In 1817 his front teeth were filed asunder for the cure of decay. They remain perfectly sound to this day.”

Cases of this kind might be greatly multiplied if it were necessary; these, however, appear to us sufficient to show the utility of the operation when properly performed.

The operation of filing, for the removal of decay of the teeth, as may be drawn from what has been said above, is, generally, applicable in those cases, only, where the disease has just become apparent, and before it has progressed so far as to form a cavity in the bony substance. After it has advanced to such an extent as this, the entire removal of the decay, by means of that operation, would, in most cases, render it necessary to file away such a large portion of the sound tooth as either to disfigure it, or to render it less capable of sustaining the pressure its office requires. As soon, therefore, as it is discovered that the use of the file would be injudicious, recourse must be had to another operation: that of filling, or, as it is more commonly known, plugging. This is the most important, and requires more judgment and skill than any other, operation within the range of the profession. The object proposed by the performance of this operation, is the entire removal of the decayed portion of the tooth, and the protection of the remaining part from the injurious action of the fluids of the mouth. Although the diseased bone may be perfectly removed from the cavity, if this be not so filled as to protect the exposed bone, underneath, nothing will be gained. The operation of plugging consists, then, in cutting away the decayed part of the tooth, forming a properly shaped cavity, and filling it solidly with a substance capable of resisting the action of the fluids of the mouth, and of answering as a substitute for the portion which is lost by disease.

This operation, except in rare cases, where the teeth are



of extremely soft texture, may be safely pronounced *certain* in its preservative effects, if the disease have not made too great advances before it is performed. Instances have come under the author's own observation, of fillings having remained, in the same condition as when first inserted, for twenty-five years, and he has heard numerous cases mentioned, by others, of a much greater durability than this. There is, indeed, no reason why teeth, properly filled, at an early stage of the disease, for which they are so treated, should ever afterwards decay, and, if the filling drops out, after a lapse of two or three years, except in the cases above alluded to, the patient may generally be satisfied that the operation has been badly performed. It is common to hear persons remark that it is useless to have any operations performed on the teeth, and especially this one, having found it in their own cases of no service whatever. But this is attributing the want of efficacy, in arresting decay, to the operation itself, when its failure is nearly always attributable to the unskilful manner in which it is performed.

A very strong case in point is mentioned by the gentleman, from whose work we cited the cases, when treating of filing the teeth. He was called upon to extract several painful teeth, for the daughters of a gentleman of the city in which he resided. The young ladies informed him that a number of their teeth had been plugged, two years before, but that all the plugs, with a few exceptions, had come out. Dr. S. found, upon examination, that the few which remained, did not protect the teeth from decay, in consequence of the imperfect manner in which they had been inserted; and he felt it his duty to represent to the father the necessity of resorting, at once, to the proper measures for their preservation.

"Sir," replied the gentleman, "you will pardon me when I tell you that I have little faith in the means you recommend, for the preservation of my daughters' teeth. I have spared no expense that they might be preserved.

They were all plugged two years since ; for which I paid one hundred and fifty dollars, yet you say the operations have failed. I believe they have been more injured than benefited, and that this plugging and filing teeth break up their structure, and make them decay more rapidly."

It is exceedingly mortifying, to every honorable minded dentist, to hear such remarks as these, (and, unfortunately, it is too often his lot to be obliged to listen to them,) for they imply that his vocation is an imposition, and that he is an impostor. And it is always impossible for him, under such circumstances, to convince those who have suffered injury, that any means of relief is within their reach. His reasoning, at the time, is regarded as specious, for he is looked upon as striving to bring about some pecuniary advantage to himself. Perhaps, too, the unprincipled person, through whose agency they have suffered, urged as strong reasons for the necessity, and promised as much for the success, of his miserable attempts. As it is necessary that this operation, to be successful or useful, in any degree, should be thoroughly performed, it is our intention to dwell long enough on the subject to place so much information within the reach of our readers as will, at least, guard them against the very bald impositions which are daily practised.

As it is rather more difficult to perform this operation upon teeth slightly decayed, (but still too much so to be treated with the file,) patients are, sometimes, told that their teeth are not decayed enough to be plugged, and are sent away to wait till disease has done part of the work of the dentist. But no such temporizing plan, as this, must be followed ; if a tooth is so far decayed that the diseased portion cannot be removed with the file, it should be filled, without delay, and the sooner this is done the more certain will be the success of the operation. This is a rule to which, at this time, we can remember no exceptions, and we would advise every person to ponder well the reasons of his dentist, for desiring, in a case of this nature, any delay. Delays are generally dangerous ; with regard to

the teeth especially so. A person, with some of his teeth in the condition here described, may go away, and, either in consequence of ill health, absence from a place where he can have access to a competent dentist, or other cause, be compelled to wait so long that his teeth cannot be preserved by any operation.

The teeth may be filled, with a prospect of preservation, amounting almost to certainty, at any time before the disease has reached the pulp cavity, and affected their vitality; and even when disease has progressed thus far, and toothache is produced, they may often be filled, and preserved a number of years, by adopting measures we shall presently point out.

As there is some difference in the methods of preparing the different classes of the teeth for filling, we will describe, separately, those adopted for each.

When the front teeth become so much diseased, on their lateral surfaces, that it is necessary to have recourse to this operation, to preserve them, they must be first separated from each other. If the patient is under the age of twenty years, and there is sufficient room, in the jaws, to allow this object to be effected, the teeth should be gradually pressed apart by inserting between them a piece of raw cotton. This should be sufficiently thick to cause a sensation of pressure, and should be increased in thickness, from day to day, until a space wide enough to allow the free use of instruments, for the insertion of the filling, is made. In effecting this, considerable soreness will, in some cases, be produced in the teeth, which, after the requisite space is obtained, must be allowed to subside, before they are operated upon. The material used for separating the teeth must, however, in the mean time, be retained in its place, otherwise the space will close again with great rapidity. The separation of the teeth, in this manner, can be effected with greatest advantage, in young persons, and where there is plenty of room in the jaws. In adults, even, where there is sufficient room, it is not always advisable to attempt it, for,

as the teeth are then firmly fixed, inflammation of the membranes, within the socket, is frequently a consequence. When the arch is entirely filled no space can, of course, be made, in this manner, between any of the teeth.

When the teeth can be separated, by the method above described, it enables the dentist to perform a most perfect operation, without, in any manner, injuring their natural form. After the substance, by which they were separated, is removed, the teeth take, again, their original positions, and, if they have been well filled, are less liable to decay than when they were perfectly sound. This may, at first sight, seem to be a strange and unfounded assertion, but its truth will, upon a little nearer examination, be acknowledged. The front teeth, when close together, are most liable to decay on their lateral surfaces, just at and near the points of contact; for the corrosive secretions of the mouth, by which they are decomposed, are there most readily retained. The decayed cavities, by the operation of plugging, are filled with gold up to the surface, and, in this manner, instead of bone at the points of contact, is an indestructible substance.

When circumstances will not admit the adoption of the above described method of separating the front teeth, recourse must be had to the file; and here, again, it becomes an instrument of the first importance. In filing these teeth, preparatory to filling, the same method should be followed as when it is done for the removal of decay. A thin file, cutting on both sides, should be passed between them and allowed to go nearly, but not quite, up to the gum. A file, cutting on one side, only, should then be taken and directed so as to cut away the inner side of the lateral surface of the affected tooth, so that the cavity will look toward the inside of the mouth. When this caution is observed the filling, when inserted, will not be perceptible externally. The little shoulder of bone should, in this, as in the former instance, be left, to prevent the space from closing; for, in this case, unlike that where the teeth are separated with-

out the use of the file, the enamel is removed entirely from the lateral surfaces, and it is important that they should now be left, so that they can be kept constantly clean. This, indeed, should be an invariable precaution; whenever the teeth are filed, for any purpose, it should be done in such a manner as to prevent them from coming together again. If a space is once made, by this means, it should always after be preserved.

The front teeth, separated by either of the modes, above described, are now prepared for the operation of filling. The cavity, in one of them, is supposed to be fully exposed. All the decayed portion must now be carefully removed by means of suitable small, well tempered, cutting instruments. The operator should, in the first place, cut away the diseased portion till nothing is to be seen within the cavity, but the white, healthy bone. It is absolutely essential to the success of the operation that every particle of the diseased bone should be removed; and its frequent failure is generally attributable to the imperfect manner in which this part of the operation is performed. After the decayed portion is cut away, in this manner, the cavity must be so formed as to retain the metallic filling, when it is inserted; this is done by giving it a cylindrical shape, down to the very bottom, or even making it a very little larger, within, than at the orifice, or by cutting a shallow furrow just within the opening. When the front teeth decay, on their outer or inner faces, the cavities are easily reached and treated without any previous preparation.

When the bicuspid, or molar teeth, are decayed upon their lateral surfaces, they may, under some circumstances, be separated, like the front teeth, by the insertion, between them, of substances which will press them apart. This mode of separation cannot, however, generally, be practised, so successfully, on these teeth, and recourse must be had to the file. This instrument must be used so as to form a V shaped space, like that described when treating of filling the teeth. The apex of the space should not be left sharp, but somewhat rounded out. The space must be



sufficiently wide to expose the decayed portion freely ; it must, indeed, always be borne in mind that, when the file is used for this, or any other purpose, there is greater danger of doing too little than too much.

When decay affects the grinding surfaces of the bicuspid or molar teeth, the preparation of the cavity, for the filling, is very simple. As the decayed part, in these situations, is so easily reached, a drill, so shaped as to give the cavity the proper form, for holding the filling, is, generally, used. Whilst making use of this instrument it is necessary to dip it, frequently, into cold water, as it becomes, rapidly, heated, and will then cause violent pain.

The situations of decay, here mentioned, are those which most commonly occur, but there is, of course, a great variety of peculiar cases which it would be useless, if it were possible, to enumerate. Few cases, if any, occur, where the decayed cavity is so situated that it may not be reached and successfully treated, by the skilful practitioner.

The preparation of the cavity, for the filling, is the only part of the operation which produces pain. We have already indicated that, after decay affects the bony portion of the tooth, it produces inflammation in that structure. When such is the case, it becomes extremely sensitive, and although a tooth may be but slightly decayed, the mere touch of an instrument will, sometimes, produce the most excruciating pain. This is what renders the removal of the decayed bone, from a tooth, long before the disease has penetrated to the internal cavity, so extremely painful, deterring many persons from undergoing the operation. The pain, in many cases, is felt only at the commencement of the operation, and ceases after two or three vigorous strokes of a sharp instrument are made. Very often, however, this desirable end cannot be so readily attained, and extreme pain continues to be produced until the operation is completed. But, under such circumstances, this tenderness may be, entirely, removed by the application of a very small portion of arsenious acid to the diseased part. In the use of this



article, however, the greatest caution must be observed, for it is a powerful remedy, and very active in its effects. By its use an irreparable injury may be inflicted, upon the teeth, before the patient or operator is aware of it.

When the effects of this article, upon the teeth, were first discovered, it was hailed, by nearly every member of the profession, as supplying a great desideratum, and it came, at once, into extensive use. But it was found, in many cases, to produce very bad effects, and was then, by a great many of those who were, at first, its warmest advocates, entirely abandoned. But this loss of confidence arose from the abuse of the article.

When used for the purpose of destroying the sensibility of slightly decayed teeth, about the twentieth part of a grain of the arsenic, in the form of a powder or solution, should be used. A small piece of cotton, moistened with the solution, or first wet, and touched to the powder, should be applied directly to the sensitive part, and covered, securely, with wax. As a general rule, it should not be allowed to remain, in the cavity, more than four or five hours, for, although the decay may not have penetrated so deeply as to reach the pulp, in the natural cavity of the tooth, the pulp may be so affected, by absorption of the arsenic, as to be deprived of life, as effectually as if it were, at first, placed in direct contact with it. This is the way in which injury is inflicted, in such cases, by the use of this article. When used for the purpose, here indicated, no pain should be experienced, and it is a good rule when any uneasiness in the tooth, under treatment, is produced, to remove the arsenic, at once, and cut away all the decayed bone; if the pain continues after the removal of the preparation, a little pure kreosote will relieve it. It will, sometimes, be found that, although the preparation has caused no pain, whilst it remained in the cavity, after its removal this unpleasant symptom will be experienced. This is always in consequence of having allowed it to remain too long, and, although the arsenic contained in the

cotton is removed, enough has been taken up by the tubes of the bony substance of the tooth, to produce inflammation, of the internal membrane, and its results. In such cases the kreosote must be applied as soon as pain is felt; for, if inflammation, to any extent, be developed in the pulp, it cannot, easily, be reduced. In cases where it is necessary to take out the preparation before the tenderness of the tooth has been removed, this will be accomplished by applying it repeatedly, and allowing it to remain in the cavity but a very short time, always taking care each time it is removed, to cut away as much of the decayed portion as possible. With the teeth of children, this course will often be found necessary, for, as their teeth are rather less dense than those of the adult, the arsenic is liable to penetrate the bone with greater rapidity, and it is much better to take a great deal of trouble, and exercise much patience, than to run the risk of inflicting irreparable injury. This caution, especially with regard to the front teeth, should be particularly observed.

No danger is to be apprehended from the poisonous qualities of this article, when used in the quantity directed. As an internal remedy, a larger quantity than the twentieth part of a grain, is often administered, several times in a day, so that, if the portion which is put in a tooth were to be swallowed, no unpleasant effects would follow. Care should be taken, however, to avoid the treatment of too many teeth, in this manner, at once.

It was with some hesitation, for fear that, in the hands of injudicious, or careless persons, it might be the means of inflicting injury, that the author made any mention of this article here; but, aware, as he is, of the number who hesitate and are deterred, to the entire destruction of their teeth, and in many cases, the consequent loss of health, from having preservative operations, and, especially, this one, performed on their teeth, for fear of the severe pain generally attendant upon it, he did not feel that he would be justifiable in withholding a fact of so much importance. There are practitioners, he is aware, occupying a high po-

sition in their profession, who regard this article as more injurious than beneficial to the teeth ; but, from some years experience, during which time the author has been constantly in the habit of using it, he has observed the most satisfactory results, without having met with a single instance, in which its effects have been injurious, except when, like most others, in the profession, when this article was first introduced, he used it, incautiously ; and this has been the experience of some others, with whom he has conversed, who have observed its effects, closely. But he cannot leave the subject, without, again, urging strongly, the extreme caution which should be observed in making use of arsenic for this purpose.

The decayed portion of the tooth being entirely removed, and such a shape given to the cavity as to insure the permanent retention of the material, used for filling, it is ready for this part of the operation. The best material for this purpose is pure gold, prepared in a manner similar to that used for gilding. Gold foil, as that which is used in filling teeth, is called, is, however, much thicker than gold leaf ; one sheet of the former weighing about as much as thirty leaves of the latter.

If the cavity is small, a portion containing a sufficient quantity of the material, to fill it entirely, should be cut off from the sheet of gold foil ; this should be folded smoothly into a thin strip. After the gold is thus prepared, the operator should select the filling instruments he will require, trying each one in the cavity, to be sure that it will perfectly answer the desired purpose. He should then wash out the cavity, with alcohol or water, so as to remove any loose particles of bone which may remain. Then, with a napkin, he should wipe the affected tooth, and those adjoining, perfectly dry, and after he has done this, dry out the cavity, itself, by forcing into it, repeatedly, small locks of raw cotton. He should now direct the patient to keep his mouth open during the whole time required to effect the filling. This is very essential ; for

moisture, in several ways, lessens the probabilities of the success of the operation. All the necessary instruments should be so near at hand that it will not be necessary, for a moment, to leave the patient whilst the gold is being forced into the cavity.

The operator should now, with a suitable small, blunt-pointed instrument, introduce one end of the strip of gold foil into the cavity, down to the very bottom, and push it to one side, so that the strip will touch one side of the cavity, extending from the bottom to the top. The instrument should now be carefully withdrawn, and a fold made against the portion of the strip first introduced. The upper portion of this fold must extend a little above the orifice of the cavity, whilst the lower part touches the bottom. In this manner, fold after fold is introduced, until no more of the foil can be, by this means, forced into the cavity. The portion which projects a little above the surface, should now, with a larger and blunter instrument, be pressed downward with as much force as the tooth will bear. After having somewhat smoothed the surface, by this means, a smaller pointed instrument should be taken, and every portion, of the surface of the filling gone, carefully, over, and, in the same manner, pressed forcibly downward. If any part should be found to yield under this pressure, a wedge-shaped instrument, of small size, should be used, so as to make, if possible, an opening, at that part, in the filling. This opening should be filled with gold, and the surface of the filling tried again and again, till every part is found to be firm and unyielding. The projecting part of the filling should then be removed, by a cutting instrument, with a broad blade, when situated in the crown; when on the lateral surface of the tooth, with a half-worn file. Nothing more now remains than to polish, carefully, the exposed surface of the filling.

The plan, here described, is applicable, principally, to small cavities; but when the decay has progressed to such an extent, as to make a very large cavity, the manner of

filling it is somewhat different. The gold may be folded, into a strip, as in the former case, or made into a little roll, at the option of the operator. The gold should be introduced, in the manner just described, and folded into the cavity till it is filled. Into the centre of this, between the folds of the foil, a wedge-shaped instrument should be forced, and the gold thrown out toward the sides of the cavity. In performing this part of the operation, great caution must be observed, to avoid splitting the tooth. The opening, thus made, should be filled with gold. A wedge-shaped instrument, of smaller size, should now be pressed down into the centre of the new filling, and, into the opening thus made, gold should be introduced. In this manner, should portion after portion of the gold foil be pressed in, until the filling becomes almost as firm as the hammered metal. The projecting portions should then be removed, as in the former case, and the surface of the plug smoothed and burnished.

The operation can be performed in this manner, at any time, before the decay has made an opening into the internal cavity of the tooth. When it is found that, in removing the decay, the internal pulp must be exposed, it should be so carefully cut away as not to wound this body. If the opening, through the bone, into the cavity of the tooth, be very small, the vitality of the pulp may be preserved, if the decay is not situated on the grinding surface, by inserting the filling in such a manner that it will form an arched roof above the opening; for if it be allowed to come into contact and press against the exposed pulp, all the consequences of inflammation, in this body, will follow. To effect this, however, a dexterous and experienced hand is essential. This object may, also, be effected by placing a little gold cap above the exposed pulp, and filling the cavity, firmly, in the manner above directed. A covering of lead is, sometimes, used, in such cases, with advantage; it may be laid directly against the small opening in the cavity. This last practice is founded upon the well-known



quality possessed by this metal, and some of its compounds, of allaying incipient inflammation.

After an opening, of any considerable size, is made into the internal cavity, the practice, above described, will not answer; more or less irritation will have been excited in the pulp; and, in most cases, there would be difficulty in preparing the cavity so as to support a gold cap above the opening, even if the surrounding bone were sufficiently firm to afford it a support. The only hope, now left, is in the entire destruction and removal of the pulp itself. This can be, most effectually, accomplished by the use of the preparation of arsenic, above mentioned. But, if the pure arsenic were applied to the exposed pulp, the most excruciating pain would be developed, violent inflammation of the membranes, within the socket, would follow, ending in the entire destruction of the tooth. By combining a proper proportion of morphine and kreosote, with the arsenic, these effects are avoided, and the pulp, in most instances, destroyed, with little or no pain. This must be done, with any prospect of success, before the pulp has been exposed sufficiently long to have caused tooth-ache. When the pulp is destroyed, as a consequence of tooth-ache, little hope is, generally, to be entertained of the preservation of the tooth. In such cases, inflammation having extended from the internal pulp, to the membrane which covers the root, of the tooth, within the socket, suppuration takes place here, and the disease assumes a chronic form. A tumour is formed at the end of the root, and a discharge of pus, through the opening in the root, which is now much enlarged, is continually kept up. It will readily be seen that if the cavity is filled up solidly, and the discharge prevented, from making its escape, in this way, that it will find its way out at some other point; this is, usually, through the socket and gum opposite the extremity of the root. But as this constitutes a disease, which is generally treated under a distinct head, as gum-boil, or alveolar abscess, we will, for



the present, dismiss it, and take it up again in its proper place. The same result sometimes follows the application of arsenic, when much pain is produced by its action upon the pulp.

The question may be asked whether the destruction of the pulp does not destroy the vitality of the affected tooth? To a certain extent it does, but it will be remembered that the root of each tooth receives vessels and nerves from the membranes which surround it, by which, to a certain extent, it is endowed with life. If this were not the case the removal of the pulp would be followed, invariably, with the destruction of the tooth, and would always be a useless practice. Experiments are being, daily, made upon teeth in this condition, and the results closely watched, by several observers, in the profession, and there is every reason to believe that, in a short time, success in their preservation will be more certain than it is at present.

In applying the arsenic to the tooth, for the purpose of destroying the pulp, this body should be fully exposed. The preparation, used most successfully for this purpose, consists of about the twentieth part of a grain of arsenic, ground in kreosote, to which is added the same quantity of sulphate of morphia. This should be put upon a small piece of cotton, and, after the cavity, formed by the decay, is wiped out, carefully, applied directly to the pulp, and allowed to remain twenty-four hours. It should then be removed, and a larger opening made into the internal cavity of the tooth, and as much of the pulp cut away, if it is not entirely destroyed, as can be done, without producing much pain. The preparation should then be applied, again, in the same manner. After this is removed, the cavity of the tooth should be allowed to remain open a day or two, and then securely filled, in the manner above described, down into the root, as far as it will receive the gold. In treating the front teeth in this manner, great care should be taken to remove every portion of the pulp from the crown;

for, without this is done, they will, generally, in a short time, become dark.

It may be well to describe, here, the appearance which a filling, properly inserted, should present. It should, in the first place, be so solid that great force is required to make any impression upon it, even with a pointed instrument. It should entirely fill the cavity, produced by the decay, even with the edges, all round, be freed entirely of ragged edges, and have a perfectly smooth and polished appearance. No traces of decay must be apparent, in any of the natural depressions which may surround it; this is especially to be guarded against in the molar teeth. It must be carefully observed, too, that no little corners or angles, of the cavity, remain unfilled; for this would allow the ingress of the fluids of the mouth, which would gradually penetrate under the filling, and cause the tooth to decay as rapidly as before it was filled. We have heard of directions being given to patients, by their dentists, to avoid eating any glutinous substances, after they have had this operation performed on their teeth, for fear that the fillings will be pulled out; if the teeth are filled as they should be, the patient and even the dentist himself, will find considerable difficulty in removing them with instruments, suitable for the purpose. Fillings which can be so easily pulled out, when they are first inserted, will, in a very short time, fall out of themselves.

We have thus far made mention of no other material for filling decayed teeth than *pure gold*; and this, indeed, is the only metal hitherto used, for the purpose, which will, in all cases, effectually preserve them. It is quite indestructible, even when exposed to the action of the fluids of the mouth, in a condition so corrosive as to decompose any other metallic substance, except, perhaps, platina. When prepared in the form of foil, as it is used by dentists, it is sufficiently ductile to answer, in the hands of a skilful operator, every desirable purpose, and it may be safely stated that any tooth worth filling, at all, may be success-

fully filled with gold. When solidly packed into the cavity of a tooth, it excludes, effectually, the fluids of the mouth.

Besides gold, the only material which can be used, with any hope of permanent success, is *tin*, prepared in a similar manner to the gold foil. When the general health is good, and the teeth little predisposed to decay, this metal is found to preserve them as effectually, perhaps, as gold. But in cases where the fluids of the mouth are much disordered, it oxydises rapidly, and, instead of preserving the teeth, rather increases their tendency to decay. It can be used for filling the back teeth only, its dark color rendering it unsuitable for those in front.

Tin foil is called, by some dentists, *silver*; but this latter metal is now rarely, if ever used, in consequence of its greater destructibility than even tin. It is also harder and less ductile than that metal.

The latter objection to silver is, also, applicable to *platinum*, which, in some other respects, would be suitable.

A number of other materials, such as *wax*, *gum mastic*, *lead*, and *metals fusible at a low heat*, have been used, but, having always failed to answer the desired purpose, have been laid aside.

But a material far more objectionable than any of these, is still used to considerable extent, by a number of practitioners, and, because it is still used, we will endeavor, to the best of our ability, to display the evil results which follow its use in such a light that all, who peruse this book, will find enough to convince them that it not only does not answer the purpose intended, but that it does great harm. The reader would readily pardon us for taking up so much time with this subject, as is our intention, if he could observe, as frequently as we are compelled to do, the very destructive effects of this most pernicious article: we allude to what is daily advertised, as *cement*, *mineral cement*, *mineral succedaneum*, *lithodæon*, &c.

Cements of several descriptions have been used, from

time to time, but have never been regarded as answering more than a temporary purpose. Powdered quick lime and Canada balsam, mixed together into a thick paste, has been tried, and, although it soon acquires a pretty firm consistence, lasts but a short time. A cement, composed three parts of the sulphate of lime, and one of the rust of iron, has been prepared; it soon hardens, after having been placed in the cavity of the tooth, at a paste-like consistence. We have just observed, in one of the medical journals, that a composition imitating the structure of the tooth, of lime and phosphoric acid has been invented; but with regard to every thing of the kind it must be remembered that, however well it may promise to answer the desired purpose, its utility can be tested by time, only, and practitioners, although they should not reject it, merely because it is new, should be very cautious how they give it their sanction.

The cement which we propose to examine here, and which, as we have stated, is still used to considerable extent, is much more injurious than any which has ever before been employed. With regard to most of these, the injurious effect is merely negative, as they fail to arrest decay in the teeth filled with them; with this, much injury, as we will presently show, is caused by the active effects of the article. The fact that its use is still countenanced is only another proof of the ignorance of the public with regard to the subject of dental surgery; for, in almost every case, it so soon fails that any one who is aware that operations upon the teeth, should and can, when performed in a proper manner, preserve them, would be, at once, convinced that it is useless for the purpose intended to be effected by it.

This cement is an *amalgam of mercury and silver*. It was first introduced, into this country, by two persons named Crawcour. They came to the city of New York, in 1835, and announced that they had discovered a substance, which, moulded in a soft condition into the cavities

of decayed teeth, would, in a few minutes, acquire a degree of hardness equal to that of the enamel, and would preserve them, no matter how much diseased, to the end of life. The papers, at the time, teemed with notices of the wonderful discovery, and it was soon generally believed that, with little trouble, or pain, people would be able to build up their decayed and broken down teeth, with a substance far superior, in every respect, to that of which they had been originally composed. There was something exceedingly taking in the representations of these men, and as they so fairly called upon the public to visit them, and be convinced, by actual observation, that they could do all they promised, a large number of persons went to them. The composition used, became hard in a few minutes, it is true, and all went away rejoicing, and regarding these imposters as benefactors of the human race. But the injurious effects of the cement very soon developed themselves, and its originators were visited with merited disgrace and execration.

Since that time it has been more quietly used, disguised under a variety of names, but, invariably with the same results.

Let us now examine, cursorily, the intrinsic claims of this article to public confidence, or rather, the objections which exist to its use.

It fails to answer a very important purpose, designed to be effected in filling teeth: the exclusion of the fluids of the mouth; in hardening, for it is placed in the cavities of the teeth in a soft, paste-like condition, it becomes porous, and although the surface may appear very hard it is readily penetrated by the fluids of the mouth.

It soon becomes black, and, for this reason, could never be used for filling the front teeth even if it would answer the purpose of preserving them.

The mercury, which is one of its essentials, is liable to undergo changes in consequence of the action of the fluids of the mouth upon it, and, under such circumstances, por-



tions being carried into the stomach produce all the injurious effects of this article, in some of its forms, upon the general system. This is no imaginary apprehension. A very short time since the author met with a case, in which salivation of a very violent character was said to have been produced, in consequence of such a change being effected in this material, with which several teeth were filled. The patient was a young girl, of delicate constitution, but her physician, under whose exclusive care she had been for several years, knew that, during the whole of that time, she had taken no mercury in any of its forms. This is not by any means an isolated case; such have been recorded by several writers upon the subject since the amalgam, here spoken of, has been in use, and the author has conversed with several intelligent members of the profession under whose notice similar cases have come.

The inefficiency of this article, for the purpose of preserving decayed teeth, is abundantly proved by experience. In the course of a practice of several years, the author has had occasion to remove many fillings of this cement, and has never, in a single instance, failed to find the teeth, so treated, rapidly decaying underneath the fillings. This, too, has been the experience of every well-informed practitioner with whom he has conversed upon the subject. A number of recorded cases might, if it were necessary, be here cited, but sufficient reason has been shown, we trust, why the use of this pernicious article for the purpose of filling decayed teeth should be abandoned, and why public confidence should be withdrawn from every practitioner who, under any circumstances, makes use of it. It is sometimes urged as a reason, for its use, that teeth are too much decayed to be filled with gold, and may be preserved by this material for many years. But this is not the case; for a tooth which is too much decayed to be filled with gold or tin foil, can be made, by this means, to last but a very short time, if indeed any thing can be done toward retarding the progress of the disease. In all such cases,



rather than run any risk of the constitutional effects, of this cement, the diseased tooth should be extracted. There are two reasons, only, it seems to us, which can influence any practitioner in the use of this material for filling teeth, either ignorance, or a disregard of, its injurious effects : and these, it must be admitted, are equally disqualifying. It is not the desire of the author to attempt to lessen, in the eyes of the public, the claims of any respectable practitioner to their confidence, or to join those, too many of whom, he regrets to know, have a place in the ranks of the profession, who condemn all operations performed by other hands than their own. He is pleased to know and acknowledge that there are many honorable and well qualified practitioners, engaged in the profession, under whose influence it is rapidly advancing to a higher position of respectability and usefulness. But he cannot, nor does he desire to, shut his eyes upon the fact, that a very large number are much better qualified to pursue some other avocation than the important one, the duties of which they have taken upon themselves to perform ; and he is determined, to the best of his ability, to place such information within reach of the public as will guard them against the impositions of such persons.

## CHAPTER VI.

### OTHER DISEASES OF THE TEETH.

Bony deposit upon the roots of the teeth—Causes—Symptoms—Sometimes confounded with *tic douloureux*—Treatment: extraction—Loss of vitality of the teeth—Causes—Consequences—Extraction always necessary—Accidents occurring to the teeth—Treatment when a tooth is dislocated from its socket—Less serious injuries—Fractures of the enamel—Treatment—Wearing away of the teeth, by mastication—Abrasion—Extraction of the teeth—Necessity of a knowledge of the anatomy of the jaws, to qualify a person for the performance of this operation—Serious accidents which, sometimes, follow its unskilful performance—Terrible case—Instruments used for the purpose—The tooth key almost out of use—Forceps best adapted for this purpose—Trifling accidents liable to occur with the best practitioners—Breaking off the crown of the tooth—Fracture of the socket—Excessive bleeding from the socket of an extracted tooth—The method of arresting it—Common accidents resulting from ignorance—Occasional difficulty, on the part of the patient, to determine which tooth causes pain—Method of doing this—Extraction of the wrong tooth—Extraction of two or more teeth at once—Teeth extracted by mistake, never to be replaced.

THE disease, known by the name of exostosis, is a deposition of bone upon some parts of the roots, of the teeth, subsequent to their formation; it generally takes place near their alveolar extremities. The accompanying drawing of a tooth, affected in this manner, with one of the same class, in a healthy condition, will convey a clear idea of the nature of this disease.

FIG. 21.



This deposition of bone is a consequence of an inflammatory action set up in the membranes investing the roots of the teeth; it rarely occurs, except in individuals in whom exists a predisposition to formations of this kind; and, when it is present, more than one tooth will, nearly always, be found affected. The inflammation which causes the deposition of bone, is, generally, a consequence of decay in the tooth or teeth affected; but exostosis may proceed from other causes, and attack teeth which are, otherwise, perfectly free from disease. When it proceeds from decay, it is not always necessary that the affected teeth should be decayed to any very considerable extent; the irritation produced, in a tooth, by incipient decay, when a predisposition to this disease exists, will be sufficient to produce it.

The most common symptom of exostosis is a slight, dull, continued pain, in the part of the jaw where the affected tooth is situated. The formation of new bone may continue, for a considerable time, if a proportionate enlargement of the socket takes place, which is usually the case, without causing so great an exacerbation of this symptom, as to make the patient determine upon the extraction of the affected tooth. But when the deposition of bone is too rapid, to be accommodated within the socket, containing the diseased root, sharp lancinating pains, resembling those symptomatic of *tic-douloureux*, are experienced. In cases where no decay is apparent, in the painful tooth, or where it has made but little progress, the patient will be unable to account for the cause of his suffering. If, however, upon striking the painful tooth, with a hard substance, a sharp pain is experienced, in the socket, there is good reason for believing that it is affected with the disease here described. In making an examination of this kind, the suspected tooth must be struck with the instrument, used for the purpose, in every direction; for the pain produced is caused by the sudden compression of the inflamed and highly sensitive membrane of the root, between

the new deposition of bone, and the socket of the tooth. If the disease be located at the right side of the root, of a tooth, a blow from the opposite side will produce no unpleasant sensation, whilst one from the affected side will furnish painful indications of the existence of exostosis.

A knowledge of this disease, of the teeth, is of much importance, as it frequently gives rise to painful nervous affections, which are, sometimes, confounded with constitutional disorders. When such painful affections result from this disease, in apparently sound teeth, it is much more difficult of detection than when such teeth are much decayed. Many cases have occurred of *neuralgia*, of the face, or *tic-douloureux*, as it is more commonly known, which, having been unsuccessfully treated, with the usual constitutional remedies, for a considerable length of time, have been traced to this source, and, immediately, relieved.

When exostosis has attacked the teeth, nothing, of course, remains, but the extraction of such as are affected, for no treatment will give permanent relief. The sooner this is done, too, after it is discovered that a deposition of bone exists, the better; for, although the alveolar cavity may increase, in size, toward the base, as the bony substance is added, the opening toward the gum is rarely, if ever, enlarged, so as to admit of the extraction of the tooth, with facility. In such cases, the removal of a piece of the socket, with the diseased tooth, will be inevitable.

Whilst treating of decay, of the teeth, we showed that, after the destruction of the pulp of a tooth, its vitality is partially lost, and that, if the diseased action extended to the socket, and destroyed the connexion of the root with the membrane covering it, that it would, no longer, possess any degree of life. But the death, of the teeth, is frequently produced when they are entirely free from decay. Any cause which breaks up the connexion of the teeth, with their sockets, must produce this result. These causes are various.

A blow, upon any of the teeth, sufficiently violent to break off the little chord, which enters the extremity of the root, and excite inflammation in the socket, of such character as to destroy the investing membrane of the roots; violent inflammatory fever, when there is a predisposition to diseases of the teeth; the excessive use of mercurial medicines; extensive inflammation of the gums, as will be seen when we reach that subject; improper operations, as filing the teeth, in such a manner, as to remove so much of the protecting bone, from the pulp, as to render it liable to be affected by the influences of heat and cold; and many others, have a tendency to destroy the vitality of the teeth.

When the death of a tooth is caused by a blow, or sudden and violent inflammation, it becomes so dark as to be readily distinguished from those in a healthy condition. But, when the loss of life is gradual, it does not, always, undergo so great a change; it may, indeed, remain perfectly healthy in appearance, till, having lost, entirely, its attachment to the gum and socket, it falls out. This is particularly the case with old persons, in whom the loss of vitality of the teeth is a consequence of natural causes. It is observed, too, that when a gradual destruction of the sockets, of the teeth, takes place, from an accumulation of tartar extending upon the roots, that no such change follows, and they, sometimes, lose their support and drop out, to all appearance, perfectly sound and healthy.

In ordinary cases, as soon as the death of the tooth takes place, it acts, as all dead substances, in contact with a living tissue: the gums become swollen and turgid with blood, a constant discharge of matter takes place, from the edge of the gum, or from one or more openings through it, opposite to the alveolar extremities of the roots. Destruction of the socket and the root soon follows; the affected tooth becomes loose, and, at last, drops out. But all this is attended with inconvenience, of a more or less serious character, and the best course, in most cases, will be to extract

such teeth as are entirely dead, which will always be known by the irritation they produce.

A consideration of the causes will, in many cases, point out the means of prevention, except when loss of vitality is the result of accident. The hygienic directions, to which a portion of this work will be devoted, will indicate, more particularly, the proper means to be adopted to accomplish this purpose.

This is, perhaps, the most proper place to speak of those accidents that, sometimes, occur, by which the teeth are partially dislocated, or removed, entirely, from their sockets, by a blow, or any other cause. In describing the accidents, attendant upon the extraction of teeth, at the close of this chapter, we have stated that it is, generally, improper, in cases where a tooth is extracted, by mistake, to replace it. This is, most particularly, applicable to the molar teeth, to which, alone, perhaps, this accident could happen; but the incisor teeth, which are more liable than any others to be struck out, seem to derive a greater degree of vitality from the investing membranes of their roots, and this fact renders a healthy re-union with their sockets, after immediate replacement, when they have been suddenly displaced, much more probable. But, even with the front teeth, this should not be attempted, except in young and healthy persons.

When an accident of this kind occurs, and the tooth has been struck entirely from its socket, the coagulum of blood should be immediately removed, by rinsing the mouth with tepid water, the tooth pressed firmly, but gently, into its former situation, and secured by means of a silken ligature, to the adjoining teeth. Floss silk answers, better than any thing else, for this purpose; if, however, this should not be at hand, waxed silk, of any kind, may be used. This ligature should be left undisturbed, till the inflammation entirely subsides, or the preservation of the tooth is found to be hopeless. The inflammation, for the first few days, will be high, and should be subdued by the application of



leeches to the gum. If, after a week has elapsed, the surrounding gums do not begin to put on a healthy appearance, and the tooth remain quite loose, it will be better to remove it altogether. If the tooth is merely started from its socket, it should be gently, but firmly, pressed up, again, into its place, and treated in the manner just described.

As we are on the subject of mechanical injuries, of the teeth, it will be well to say a few words of such as are of a less serious character than those just mentioned. It, sometimes, happens that a portion of the enamel, of greater or less size, is broken away. In such cases the rough edges, of the fracture, should be filed smooth and polished, and, even if the injury have extended through the whole thickness of the enamel, so as to expose the bony substance, no fears need be entertained about the permanent preservation of such tooth, if the injured surface be so left as to enable the patient to keep it constantly clean: provided, always, that the cause, by which the injury was produced, has not been sufficient to disturb the connexion of the tooth with the jaw.

The teeth, and especially the molars, are, sometimes, worn away in consequence of the friction of mastication; and, were it not for a beautiful protective provision of nature, in such cases, pain would be developed as soon as the place occupied by the internal cavity is reached. But, just in proportion as the crowns, of the teeth, are worn away, in this manner, a bony deposition takes place, within the cavity, by which the lost bone, above the pulp, is supplied. This process is, however, similar to that which takes place in old age, and, in proportion to the deposition of bone, the internal cavity must become more contracted, and the pulp smaller, till both are, at last, entirely obliterated.

The teeth are sometimes attacked by a curious disease, which affects them by a removal of the enamel on their front surfaces, near the gums, in the form of a smooth and regular groove. It, generally, begins in the central inci-

sors, and extends to the adjoining teeth, as far as the bicuspid or molars. It becomes, gradually, deeper, but always presents a smooth surface. The internal cavity is filled up by a deposition of bone from the pulp, as in the wearing away of the teeth, by mastication. As the causes of this affection have not yet been clearly ascertained, it is regarded as beyond the reach of treatment.

In this chapter, as, also, in the preceding, we have had occasion to speak of extraction of the teeth; of this operation, the manner in which it is performed, and the accidents attendant upon it, it will be well to say a few words. This is an operation which is dreaded by every one, and, by some, regarded with such horror that weeks of suffering, of a far more excruciating character than that produced by the operation itself, cannot induce them to submit to it. Extraction of the teeth must, always, be attended with more or less pain; but the present improved instruments, in the hands of a skilful operator, render it a perfectly safe, and, compared with the manner in which it was performed, a few years since, an easy operation.

As it is not the object of this work to afford instruction to those wishing to acquire a knowledge of dental surgery, as a profession, (such information may be found elsewhere,) a detailed account of the instruments, used for the extraction of teeth, is unnecessary. They are variously modified, and it would be folly for the patient to insist that the practitioner, to whom he applies for the extraction of a tooth, should make use of instruments, which might be described here as best suited for the performance of this operation; for, it is well known that every operator does best with those instruments to which he is accustomed. The same ends are, sometimes, quite as effectually accomplished by the use of very different means. If this were intended for an elementary work, it should, most certainly, be the object of the writer to point out, to the student, the most improved methods for the performance of all operations, but these methods cannot always be adopted by prac-

titioners who have, for a long time, been in the habit of pursuing those of a very different kind. Our object, as we have already stated, is, simply, to point out to the patient, who is compelled to submit himself to the hands of a dentist, a standard by which he may, generally, form some true notion of the qualifications of the person to whom he entrusts himself.

As simple as this operation may seem, it should never be performed by any one without he is acquainted with the anatomy of the parts, and understands, thoroughly, the principles upon which the instruments, he uses, effect their object. Although it is not often the case that very serious or lasting damage occurs, yet the infliction of injuries, of such character as to produce pain, greater in intensity, and duration, than that for the relief of which the patient has had recourse to the operation, is of daily occurrence. Serious injuries may, however, be inflicted, as the following horrible case will show. The author does not present this case with any intention of causing unnecessary alarm, or of deterring any one from having this operation performed, when necessary—it is *impossible* that an accident, of this nature, could happen with a dentist well acquainted with the principles, and skilled in the practice, of his profession—it is to impress, more strongly, the necessity of avoiding men of the character here pointed out, and of showing that the simplest operations, within the range of the profession, require, for their perfect performance, more information than is, generally, supposed to be necessary. The case is related by Dr. Fitch, the author of a Treatise upon Dental Surgery, as follows:

“About the year 1830, a man by the name of McIlhenry, residing near Back Creek, Bottetourte county, Virginia, called upon a blacksmith, residing in the neighborhood, named Snyder, and requested the extraction of an upper second molar tooth, of the right side. Snyder was considered a great adept in extracting teeth, with the pincers or forceps. He was a large, stout, heavy man. He

seated his patient on a low seat, or on the ground, with his head thrown far back, and firmly grasped and held, as in a vice, by the hands of a powerful man. He then placed the forceps partly on the second molar tooth; then, taking the handle of the forceps, in both hands, he gave a tremendous pull. The forceps slipped off the second molar tooth and caught upon the first molar tooth. The roots of this tooth were greatly bifurcated, and dove-tailed into the jaw, and would not pass perpendicularly out, although a slight lateral motion would have moved them instantly. The jaw proved too weak to support the monstrous pull upon it, and gave way, between the first and second molar tooth, and, instantly, both the anterior and posterior plates of the antrum gave way. The fracture continued to the spongy bones, of the nose, and terminated at the lower edge of the socket, of the left front incisor, carrying out of the jaw six sound teeth, namely: the first molar, two bicuspid, one canine, one lateral, and one front incisor tooth. The soft parts were cut away with a knife. A severe hæmorrhage ensued, but the patient soon recovered, though with excessive deformity of his face and mouth. I have the piece of jaw bone, with the six teeth upon it, now in my possession; it was very kindly given me by Dr. Munroe, an intelligent dentist of Richmond, Virginia. Dr. Royal, a respectable physician, of Lynchburg, Virginia, likewise, fully corroborated the foregoing statement of the case, and told me he had seen the piece of fractured bone, with the six teeth upon it, soon after it was extracted, wet and bloody."

A case of very similar character is mentioned by a later writer. These, it is true, are extraordinary accidents, and the great injury inflicted was the result of a most barbarous recklessness, which could only have had its origin in gross ignorance.

The instrument used, for many years, for the extraction of the molar teeth, and one which is still in extensive use,

amongst country practitioners of medicine, is commonly known as the tooth key. The principle upon which this instrument is constructed is thus, in a few words, described by Dr. Arnott: it "may be regarded in the light of a wheel and axle; the hand of the operator acting upon two spokes of the wheel, to move it, while the tooth is fixed to the axle, by the claw, and is drawn out as the axle turns. The gum and alveolar process, of the jaw, form the support upon which the axle rolls." The objection to the key is that, as the gum and alveolar process afford a fulcrum, for the powerful lever which it forms, considerable bruising and fracture of these structures cannot be avoided. Fracture of the socket is an accident, resulting, more commonly, from the use of this instrument, than that we shall presently describe. The key, however, skilfully applied, is a much better instrument than the forceps, awkwardly used, and, to many country practitioners of medicine, who find it inconvenient to carry with them a sufficient number of forceps, for the purpose, it is sometimes very useful.

The key, amongst dental practitioners, has almost entirely, given place to the forceps. These instruments are simple pincers, with the beaks so shaped as to be anatomically adapted to the different classes of teeth. Several pairs of these, as may be supposed, are required. For the upper incisor, canine and bicuspid teeth, a straight pair answers the purpose. The upper molar teeth require a pair, one for each side of the jaw, slightly curved, with points so constructed as to press down between the roots. For the lower teeth instruments with a still greater curve are used, but it is impossible, without the aid of drawings, to make any description of these instruments intelligible.

The forceps are used by applying the beak to the tooth to be extracted, and passing the points as low down, upon the root, as they can be made to go. Previously to the use of these instruments the gum should be carefully separated from as much of the root as can be reached; the more



effectually this is done, and little pain will be experienced if the lancet used be quite sharp, the less difficulty, and pain, will be experienced in the attempt to remove the tooth. After this step is taken, and the tooth grasped, firmly, with the forceps, a movement inward and outward, so as to break up the attachment of the roots to the jaw, is made, and the tooth removed by a pull upward or downward, as the case may require.

To the most skilful practitioners accidents may occur; but these are of a trifling nature. No one can avoid breaking off the crown of a tooth, under certain circumstances, but when this happens the root or roots should, generally, be extracted. To this the patient should endeavor to submit, because roots of the teeth in which a portion of the pulp still remains, are just as liable to cause pain and, in some cases, more so, than before the tooth was broken.

It is, also, a common occurrence to fracture a portion of the socket which embraces closely, and sometimes adheres to the roots of the teeth. When this happens no unpleasant consequences will be experienced if the piece broken be, at once, taken away; if not removed, inflammation and suppuration will invariably ensue. The broken piece is an irritating substance, and nature resorts to this method of getting rid of it. It is the occurrence of this simple accident which leads many to believe that their jaw has been fractured, and dentists are, frequently, visited with the consequences of such reports, because of the unpardonable neglect of not ascertaining the presence of the broken piece of bone, and removing it. After the extraction of a tooth, the operator should, carefully, examine the socket from which it was taken, (if he neglect to do so, the patient should remind him of its necessity,) and, if he find any loose pieces of bone, remove them. This can always be done, with very little additional pain, with a pair of common dressing forceps. By doing this, and explaining to the patient the nature of the accident, all unpleasant consequences will be avoided. If the patient, two or three days after having had a tooth extracted, find the gum still



sore, much swollen, inflamed and painful, he may suspect that this accident has happened; if he then go and have the broken piece of bone removed, he will save himself much suffering. It is not always the case, however, when pain is experienced, after the extraction of a tooth, that it is a consequence of fracture of the socket; it often follows when the gum, and membrane within the socket, of the tooth, have been in a high state of inflammation, previous to its removal. It may, generally, be relieved, however, by a saline purgative, taken at night, and by the application, to the part, upon a piece of cotton, of a powder composed of equal parts of pulverized nut galls and acetate of morphia.

Some cases are on record in which excessive bleeding, from the sockets of extracted teeth, has followed this operation. Some persons are predisposed to this consequence, and we have known those who could never have a tooth extracted without experiencing an alarming hemorrhage. Should this accident occur, however, there is no cause for alarm, as it may, in every case, be readily and effectually subdued, by the following simple method: When it is found that the bleeding continues an unusual length of time, the socket should be cleared of any coagulated blood, which may have formed in it, by rinsing the mouth with warm water. A strip of lint, sufficient to fill the cavity, should be taken, and one end carried down to the bottom of the bleeding cavity. Upon this, fold after fold should be firmly impacted, till the socket is entirely filled. Another piece, folded to answer the purpose of a compress, should be placed upon this, and the patient directed to close his mouth, firmly, upon it, for several hours.

We have mentioned here such accidents as might occur, with the best informed members of the dental profession; there are some others, frequently occurring, which are the result of ignorance and unpardonable carelessness. It is often the case that the patient cannot exactly determine the tooth which is the cause of pain, and may insist upon

having one extracted which is perfectly sound. It is the business of the dentist to ascertain this, which he must do, when the patient directs his attention to a sound tooth, as the seat of pain, by examining the rest of the teeth to discover which are decayed, and tender, when struck with an instrument. In this way he will often find that the origin of the pain is distant from the point at which it is felt. Ignorance of this fact, on the part of the dentist, and patient, often leads to the extraction of teeth which are not, in any manner, diseased.

Sometimes the teeth grow so closely together that, in the attempt to extract one tooth, those which are adjacent, may, also, be torn from their sockets. This may, always, be avoided, if the operator is aware of the probability that such an accident is likely to occur, by separating the crowns of such teeth with a file, previously to attempting the operation. Sometimes two or more teeth are extracted instead of one by the improper application of the instruments used, by which two are grasped. Whenever this occurs, however vexatious it may be, the patient can only submit to the loss of his tooth, for, as a general rule, no attempt must be made to replace it in its socket. This has been done and has, in some instances, especially in young persons, succeeded, but as its connexion with the system is entirely cut off, it rarely ever regains its former condition, but continues a source of more or less pain, or irritation, till it is again extracted. Sometimes, indeed, a tooth, replaced in this manner, gives rise to most frightful disorders of the mouth.

## CHAPTER VII.

### TARTAR.

Supposed to be composed of skeletons of animalculæ—Consists of bone and animal matter—Similar formations found, sometimes, in various parts of the body—Held in solution by the saliva, from which it is deposited upon the teeth—At first soft but gradually increasing in hardness—Varieties of color and consistence—Its accumulation may always be prevented—Its effects—Inflammation of the gums—Destruction of vitality in the teeth—Lungs liable to suffer—Digestion disturbed—Method of removing it—To be effectual it must be thoroughly done—Teeth much loosened, from this cause, do not, again, become firm—Use of acids for the removal of this substance highly injurious—Directions for preventing its re-accumulation after it is once removed.

THE deposition of tartar, commonly so called, in consequence of its apparent resemblance to this substance, takes place most rapidly upon such teeth, and such parts of the teeth, as are least exposed to the friction of mastication. It is composed of lime, animal matter, and mucous. By some late experimenters it has been supposed, that this substance is composed of the skeletons of animalculæ, agglutinated by means of the tenacious mucous. The fact that large numbers of living animalculæ have been detected, in newly formed tartar, seems to favor this theory. Be this as it may, the material which forms the basis, of this substance, is to be found in all the fluids of the body. From the earliest moment of animal existence up to the time when the body is completed, the lime, of which the tartar is principally composed, furnishes material for the construction of the bones, and, when the limit of increase it attained, supplies the waste consequent upon the never-ceasing changes, which are going on in these parts, as in all other parts of the frame. Large quantities, which can

no longer subserve any useful purpose, in the economy, pass, in a variety of ways, from the system. It is present, in greater or less quantities, in the saliva, and, wherever a nucleus presents itself, to which any of the particles, that are held in solution, may attach themselves, an accumulation always takes place. It is not to the mouth, exclusively, that bony concretions, of this nature, are confined, they may be, and are, formed in various parts of the system, such as, the bladder, the lungs, liver, stomach, and even the brain.

In the mouth it is deposited upon the teeth, at first in very small particles, which are attached to them by the mucous secretion ; to these additions are more or less rapidly made, if they are not removed, till large masses are, sometimes, formed, exceeding, in size, the bodies of the teeth, themselves. It is, at first, of such soft consistence, in consequence of the excess of mucous over the lime, that it may be readily removed with the brush ; but, if permitted to remain, it soon becomes almost as hard as the bone of the tooth, itself, and can only be removed by means of instruments adapted to the purpose. It collects, in largest quantities, upon those teeth situated near the openings of the salivary ducts, which pour out their fluid, it will be remembered, near the outer surfaces of the upper molar, and the inner surfaces of the lower incisor teeth. The deposition of tartar, upon the teeth, is always observed to take place, more rapidly, when the system is under the influence of mercury to such an extent as to produce salivation. These facts show that it is contained in solution in the saliva.

The tartar presents a variety of colors, from very dark to a light yellow, or white, and varies, in the same proportion, in density. That which is darkest is of the firmest consistence, and the white variety always remains so soft that, at any time, it may be readily brushed away. It is, sometimes, the case, that all these varieties of this substance, are to be found in the mouth of the same individual.

Although, in many persons, there is a very great predisposition to formations of this kind, its accumulation, upon the teeth, may be, always, prevented, by a proper observance of cleanliness. If the teeth are brushed regularly and thoroughly every morning it will be impossible that it can accumulate; for it commonly forms during the night, and is, in the morning, in a soft condition. It may, with certainty, be said, that a collection of tartar upon the teeth is always the result of more or less negligence. Its formation may, however, commence on the teeth, of young persons, before they become aware of the necessity of cleanliness, for their preservation, and, after it has once commenced forming, no degree of attention, on the part of the patient, can prevent its increase. It must be first, thoroughly and effectually, removed by means of proper instruments, and it will then be in the power of the individual to prevent its re-accumulation.

With the exception of decay there is no disorder, of the teeth, so destructive in its effects upon these organs, and injurious to the general health. There are few diseases, indeed, coming legitimately under the care of the dental surgeon, which may not be traced back to one of these two causes.

The first effect of an accumulation of tartar, upon the teeth, is more or less inflammation of the gums. This inflammation extends itself, in proportion to the increase of the irritating cause, till the membranes lining the alveolar sockets, and investing the roots of the teeth, become diseased, and the death of the teeth produced in the manner we have, already, described. Absorption of the gums and sockets now follow, the teeth lose their support, and, eventually, drop out. An accumulation of tartar, and the consequences, here pointed out, may be confined to a few of the teeth, but, in many cases, the whole denture is lost in this manner. Even when the diseased action does not extend to the sockets of the teeth, so as to destroy their vitality, the gums never escape inflammation, and are,



generally, so tender, that the use of the brush becomes exceedingly painful, and the necessary cleanliness of the mouth, is rendered impossible. The tendency to decay of the teeth is, in this way, greatly increased. But the loss of the teeth is not the worst effect of tartar accumulated in large quantities in the mouth. The breath becomes exceedingly offensive. The air, carried into the lungs, passing through a mouth in this diseased condition, under some circumstances, seriously affects the health of these delicate organs. The saliva, contributes a great deal towards easy and healthy digestion of the food in the stomach; and when its vitiated condition, under these circumstances, is considered, is it unreasonable to suppose, that, more or less derangement of the digestive functions should be produced? In the most healthy persons this state of things cannot fail to give rise to more or less disorder of this kind, and, in those at all predisposed to dyspeptic affections, the worst consequences sometimes ensue. But more will be said, with regard to this subject, when we come to treat of the constitutional effects of a diseased condition of the mouth.

The method of removing this substance from the teeth, is simple. It is done with instruments sufficiently sharp to cut, or scrape, away the tartar when it adheres closely. Generally, however, and especially when it has collected in large quantities, it is detached in scales which, are, sometimes, so large and hard as to be mistaken, by the patient, for pieces of the teeth. But, simple as is the operation, the greatest patience and care are requisite to its perfect performance; for it will be readily understood, from what has been said, above, that if even the smallest particle of the tartar be left, the portions which remain will afford a nucleus for new accumulations, which no attention, on the part of the patient, can prevent. It is not only necessary to remove it from the outer and inner surfaces of the teeth, but, by means of thin sharp instruments, that which is between them should be carefully taken away. When the teeth are much loosened, from



absorption of their sockets, great care must be taken to support them, whilst using the instruments, in order to avoid carrying them out of the remaining shallow sockets. It may be well to say, here, that, after the teeth become much loosened, from this cause, nothing can afterwards be done to give them firmness; their principal support, upon the jaws, the sockets, are gone, and nothing of course can restore these. This fact is stated that persons may not be deceived, by the advertisements of those who will promise to restore the teeth to their original healthy condition, no matter how much, or in what manner they are diseased. As the gums, in such a condition of the mouth, will always be much inflamed, they will be found to bleed, freely, whilst the operation continues; this is not a bad result, and the bleeding should be promoted by free scarifications, and repeated rinsing of the mouth with tepid water. Where the accumulation of tartar is very great it is not always advisable to remove it, entirely, at a single sitting. The tartar nearest the gums, or attached to the roots of the teeth, should always be first removed, and the gums freely scarified. Two or three days, or a week, should be allowed to elapse, and then as much of the remaining tartar removed as can be done without exciting inflammation within the sockets, by the force required in the performance of the operation. If the gums still remain inflamed they should be, again, scarified, and a like interval, as at first, allowed to elapse before the remaining tartar is removed. During these intervals an astringent wash, such as will be pointed out when we come to treat of diseases of the gums, should be used.

It becomes necessary, here, to speak of a practice which, to some extent, has obtained, amongst a number of the most respectable members of the profession: we mean that of using acids, of various kinds, for the removal of tartar from the teeth, especially where it is of that nature which renders it difficult, in consequence of the tenacity with which it adheres, to remove it in the ordinary manner. Of

this kind is the dark, greenish variety, which is seen, most commonly, upon the external faces of the front teeth. The acids, used for this purpose, certainly save much labor, and remove, effectually, every vestige of the tartar; but, unfortunately, its effects do not cease with the removal of the extraneous substance. The agent, which is sufficiently powerful to dissolve the tartar, cannot be used without producing the same effect upon the enamel, of the teeth; for the basis of the tartar and enamel is the same. The care with which it is applied, does not make any material difference, for the coating of tartar, in these cases, is so thin, and closely attached to the enamel, that it is impossible to remove the one in this way without, to some extent, affecting the other. The effect, generally, is to remove the polished surface of the enamel, leaving it rough and irregular, and thus, much more favorable for a new deposit of the same nature. The fact that tartar collects, more rapidly, upon teeth cleansed, in this manner, proves the position, here taken, to be correct. The ultimate result, in such cases, may be readily seen; every accumulation of tartar will require a renewed application of the acid, and every application of the acid will remove more or less of the enamel, till the bony substance is exposed, of the consequences of which the reader has been, already, made aware. This practice has been strongly reprobated by nearly every late scientific writer, upon dental surgery, and we cannot, therefore, be regarded as presumptuous in advising any individual who finds this operation upon his teeth, necessary, to refuse, positively, without regard to the standing of the operator, to allow the use of an acid of any kind for the purpose of rendering it more easy.

The best method, at present known, and most generally practised, in such cases, is: first to remove the tartar, as effectually as possible, with the suitable instruments, and then, with powdered pumice-stone, or a similar article, which will act mechanically, polish away any remaining portion. This is, generally, a tedious operation, and re-

quires the exercise of a great deal of patience, for, if attempted at all, it must, like all other operations, upon the teeth, be performed in the most thorough manner or else it will be useless.

If the tartar have been removed, in the manner directed, from all parts of the teeth, it is easy to prevent its re-accumulation. It collects, principally, as we have stated, during the night; for, in the day time, the friction of mastication, and the movements of the lips and tongue, prevent its deposition upon the teeth; and it is, at first, soft, and easily removed by the brush, with the aid of other articles of the toilet. The brush must not be used on the external surfaces, only, of the teeth, but upon every part which can be reached; and it should not be simply passed over them once or twice, they should be brushed with it in the most thorough manner. After the brush has been used, thoroughly, waxed floss silk should be passed between all the teeth; this is very readily done and should not be neglected night or morning. A suitable tooth-powder may be used, with advantage, two or three times a week, by individuals having an excessive predisposition to this affection. But more will be said of this subject in that part of our work to be devoted to directions for the preservation of the teeth.

## CHAPTER VIII.

### DISEASES OF THE GUMS AND SOCKETS OF THE TEETH.

Generally dependant upon local causes, but greatly modified by constitutional tendencies—Inflammation of the gums—At first generally slight but, if neglected, extending itself to the sockets of the teeth and effecting their destruction—Loss of the whole of the teeth may, sometimes, follow disease in one—Treatment—All local causes of irritation to be at once removed—Astringent and tonic washes—Nothing can be done to give the teeth firmness after they have become loosened from this cause—Destruction of the sockets of the teeth as a consequence of disease of the gums—Tumours of the gums—Methods of removing them—Gum boils; improperly so called—Causes of their production—Symptoms—Consequences—In the upper jaw abscesses sometimes discharge into the antrum—In the lower jaw through the cheek—Preventive measures—Treatment.

MOST diseases, of these structures, which come under the care of the dentist, have their origin in local irritation, caused by decayed teeth or accumulations of tartar upon the teeth. These affections are, however, in a greater or less degree, modified by constitutional tendencies; for the same cause which, in one individual, will produce simple inflammation of the gums, will, in another, give rise to disease of the most serious and malignant character.

The first effect of an accumulation of tartar upon the teeth, as we have already indicated, is simple inflammation of the gums, and this, in most cases, is removed, in its early stage, with the cause.

But, if it be neglected, and the irritating cause allowed to accumulate, the inflammation puts on a more serious form. The gums which were, at first, a little reddened, now become much swollen and congested with blood, which gives them a dark florid, or purple appearance; the edges become thickened, and, upon pressure, discharge

matter. They are rarely painful, except when touched; but they are then found to be very sensitive, and to bleed freely. The inflammation, at first confined to the gums, now extends itself to the sockets of the affected teeth; suppuration and a gradual destruction both of the lining membranes of the sockets, and those which invest the roots ensues. The vitality of the teeth is thus destroyed, and they become irritating substances, are loosened, and finally, drop out. After this takes place, all causes of local irritation being removed, the gums, generally, recover their health, and no further inconvenience is experienced. This affection of the gums is commonly, but erroneously, known as scurvy.

These are generally the effects of large accumulations of tartar upon the teeth. But sometimes the gums are secondarily affected. From various causes the inflammation may commence in the membranes within the sockets of the teeth, and thence extend itself to the gums. Decayed roots of teeth; teeth irregularly situated; and the constitutional effects of mercury, are sufficient to produce disorder of this character. The inflammation attendant upon an ordinary tooth-ache may give rise, in constitutions greatly predisposed to morbid impressions, of this kind, to disease, which will first affect the socket of the aching tooth only; but which, from this origin, will extend itself to the gums, and from tooth to tooth, till the whole mouth becomes involved in disease.

In the treatment of affections of the gums, of this description, the first thing to be done is to remove, at once, any causes of irritation. Decayed teeth, of which there is no hope of preservation, should be extracted, and any tartar which may have accumulated upon the teeth removed. It is, generally, thought advisable to extract, at a single sitting, all the decayed teeth and roots, and take away as much of the tartar as is situated upon the parts of the teeth, to which the gums, in a healthy condition, adhere. The gums should then, be freely scarified, and the bleed-

ing encouraged by holding warm water in the mouth. An astringent and tonic, wash of the degree of strength indicated by the case, should now be used. A decoction of the inner bark of the green white oak is strongly recommended, for this purpose; and we have seen it used with the best effects. It may be prepared by putting a pound of the bark in three quarts of water, and boiling it down to a quart; this should be strained, a small quantity poured into a tumbler of water, and used with a brush. When the oak bark cannot be readily procured, tincture of myrrh may be used, in ordinary cases, in the quantity of about a teaspoonful to a tumbler of clear water. The strength of all washes, for this purpose, must of course vary according to the virulence of the disease. It is essential that the teeth, whilst the gums are undergoing this treatment, should be kept, carefully, free from any irritating matter. For this purpose they should be brushed and cleansed, with floss silk, several times a day. The use of the brush may at first, be painful to the gums, and cause them to bleed freely; but, as they assume a healthy tone, the soreness will subside.

If the membranes, investing the roots of the teeth, have been partially destroyed, and the teeth much loosened, nothing can be done to cause them to unite again, and give to the teeth their original firmness.

In simple cases of inflammation of the gums, the treatment, recommended above, will, generally, be successful; but cases frequently occur in which it is with extreme difficulty, and the resort to various methods of treatment, of which it is impossible to say anything here, that a healthy action is re-established. In some few forms of disease of the gums, all treatment proves inefficient, and a cure is effected, but with the loss of the whole of the teeth. Such cases seem to be dependant upon constitutional predisposition, an adequate local cause rarely being present.

It is not always, in such cases, that disease is confined to



the teeth and soft structures of the mouth ; the bone composing the sockets is frequently involved. In ordinary cases they are gradually destroyed and absorbed ; but they sometimes decay, and, with the teeth, are thrown off from the healthy bone. When it is found that the sockets are diseased, in this manner, they should be removed as soon as they are discovered to be detached from the healthy bone.

Tumors of the gums, of various kinds, are developed by the same causes, which produce inflammation and ulceration of these structures. In most cases they are removed with the knife, but they are, frequently, of such a character as to render an operation, of this kind, unpleasant, if not dangerous, in consequence of their great vascularity, and the bleeding which is likely to ensue. When such a result is apprehended they may be removed by means of ligatures, passed round them, and, gradually, tightened from day to day till the circulation is cut off ; after which they will soon sluff away.

Gum boil is an improper name given to a disease by which the gum is secondarily, only, affected. It is, properly, an abscess, or boil, within the socket of a tooth, which makes an opening for the discharge of matter, formed in it, through some part of the alveolar wall. It usually breaks through the gum opposite the apex of the root, but it may make its way either through the internal wall of the socket ; toward the inside of the mouth ; into the antrum, in the upper jaw ; or, in the lower jaw, through the cheek, externally.

The first symptom of abscess, of this kind, is a dull, throbbing, deep-seated pain, accompanied with more or less swelling of the face ; the pain goes on increasing, in intensity, until the matter, which is formed, finds a way of escape. After this takes place the pain usually subsides, immediately.

Like the affections of the gums, above described, abscess in the sockets of the teeth is produced by any cause which will excite violent inflammation. It is frequently a conse-

quence of tooth-ache ; of a filling pressing upon an exposed

Fig. 22.



“ nerve ;” of a filling inserted in a tooth, from which a discharge from the internal cavity is taking place ; or of inserting a pivot tooth upon a root in the same condition. In consequence of the excessive irritation produced by any of these causes, a high degree of inflammation, in the pulp, is excited, which extends itself to the membrane investing the root. A little sac is now formed, at the extremity of the root, such as is represented in Fig.

22, in which the pus, subsequently discharged through the gum, is formed.

When a simple opening is made through the socket and gum, as in the case of what is commonly known as gum boil, a discharge of matter may continue, for a considerable length of time, without causing any other inconvenience than a return of the pain, and renewed swelling of the face, upon every attack of cold. The affected socket is, however, in many cases, gradually destroyed, as if it were eaten away by some corroding material ; nor are its ravages always confined to the socket first affected ; the sockets, of the adjoining teeth, are often attacked, and, in many individuals, rapidly destroyed. Such teeth, although, previously, they may have been perfectly sound, lose their vitality, and the support of their sockets, and, at last, drop out. The accompanying drawing, which represents one half of the upper jaw, exhibits a case of this kind :

Fig. 23.



It will be here seen that the external walls of the sockets of three of the teeth, have been, entirely, destroyed, and the teeth lost. The fourth shows an opening through the socket, near the apex of the root, with the bone below in process of destruction.

When situated in the upper jaw, the pus, formed in the abscess, generally makes its way through the outer or inner wall of the alveolar cavity: sometimes, however, it opens into the antrum. When in the lower jaw, and especially when it affects the molar teeth, there is great danger to be apprehended that it will break through the cheek. An opening thus formed, will continue to discharge pus as long as the affected tooth is allowed to remain; and, even when this is removed, although the disease will, thereby, be cured, a very unsightly scar will ever after remain.

Every effort should be made to prevent the development of an abscess of this kind, when it is suspected, from the presence of the symptoms, above described, to be form-

ing; for, after it has once made its appearance, nothing remains to be done, in the greater number of cases, but to extract the tooth by which it is caused. As preventive measures the following directions may be useful:

If a tooth, in which the nerve has been dead for a considerable length of time, be filled, and, after a greater or less time, a sensation of increasing fulness and soreness, to the touch, is experienced, three or four leeches should be applied to the gum of the affected tooth, and those adjoining. If this do not afford relief it will become necessary to remove the filling, or to drill a small hole through some part of the tooth near the root, or through the filling, in order to allow the matter to escape. This last treatment, however, can only be regarded as palliative; and the disease must progress till the destruction of the tooth is, sooner or later, effected. The same directions hold good, with regard to the same result caused by the insertion of a pivot tooth; in this instance, however, instead of drilling a hole through the tooth it will be necessary to cut a groove in the pivot which attaches the tooth, or a canal, in the natural root, alongside of the pivot. Particular directions will be given for the accomplishment of this purpose when we come to describe the methods of inserting artificial teeth.

When abscess, in the socket of a tooth, is apprehended as a result of tooth-ache; the nerve must be destroyed, in the manner directed, under the head of filling the teeth: if the formation of the abscess still go on, the application of three or four leeches, in the manner above directed will, sometimes, arrest its progress.

But, when it is found that these measures cannot prevent the formation of abscess, the sooner the tooth which is the cause of the trouble, is extracted, the better; and this advice becomes particularly important, for the reasons above given, when one of the lower molar teeth is the subject of the affection.

There are circumstances, however, under which it may be found impossible or unadvisable to extract the affected tooth. In such cases, as soon as, from the circumscribed elevation of the gum, the presence of matter is ascertained, a sharp pointed lancet should be thrust into the tumour, and the matter discharged. Into this opening a pledget of lint should be placed, so that it cannot close till supuration ceases. The gum will then, generally, heal up, but the disease is not cured, and, sooner or later, the abscess will form again. In most cases, we repeat, the extraction of the teeth by which the disease is caused, is the most advisable and, certainly, the most effectual remedy.

## CHAPTER IX.

### DISEASES OF THE ANTRUM.

Cursory description of the antrum—General character of diseases of this cavity—Importance of early attention to the symptoms—Simple inflammation—Symptoms—Treatment—Closure of the passage into the nostril—First symptoms exacerbated as a consequence—Accumulation of fluid within the antrum—Consequences—Treatment—Method of opening the antrum—Necessary to be kept open till the disease is cured—Injections—Attention must be paid to the healthy condition of the mouth—Loss of vitality of portions of its bony walls—Permanent opening to be closed with a gold plate—Tumours situated in the antrum—Cancerous affections—Serious effects sometimes the consequence of a very trifling cause—Importance of some knowledge of these diseases to the general reader.

WE have attempted, in the preceding chapter, to show that most of the diseases to which the gums and sockets of the teeth are subject, or those, at least, which the dentist is called upon to treat, are the effects of diseased teeth, or of tartar accumulated upon the teeth. We have pointed out the origin and progress, and some of the consequences of this local irritation, and have shown how, when favored, under certain circumstances, by a morbid constitutional tendency, extensive inflammation of the gums and loss of the teeth may ensue. But the injurious effects often extend themselves to the cavity, in the upper jaw, which, in the first part of this treatise, we have described as the antrum.

The antrum, it will be remembered, is a cavity, in the upper jaw, situated above the roots of the superior molar and bicuspid teeth, from which it is separated by a thin plate of bone, only. (Although there are two of these cavities, one situated on each side of the jaw, we will, to avoid confusion, in the description, speak of them in the singular number.) The antrum, it may be well to recall



to the reader, here, is lined by a membrane continuous with that of the nostrils, and, like the latter membrane, it constantly secretes, in its healthy condition, a thin mucus, which escapes through a very narrow opening into the nose.

Although the diseases, by which the antrum is affected, are classed under several distinct heads, and require different treatment, nearly all those which come under the care of the dentist, are the consequences of inflammation. This, in an early, stage, is readily subdued; first by the removal of the causes by which it is produced, and then by recourse to such treatment as is called for in all ordinary cases of inflammation. But, in consequence of the obscurity of symptoms of disorder in this cavity, the dentist is rarely consulted, before the disease has assumed such a serious form that more active treatment is called for; and even where the operator makes use of all the remedies within his knowledge, it is not, always, in his power to arrest the progress of disease or to prevent injurious results.

Simple inflammation of the antrum, is, generally, characterized by a dull, heavy, deep-seated, continued pain in the cheek; this may often be mistaken for a rheumatic affection. It is, generally, accompanied with more or less pain and soreness of the teeth of the affected side. When these symptoms are present, the teeth should be carefully examined, and all those which are so much diseased as to render it probable that they are the cause of the disorder, should be at once extracted. If the patient is, generally, healthy, and the inflammation should not have so far progressed as to cause a thickening of that portion of the membrane which lines the opening into the nostril, thus closing this passage and preventing the escape of the natural secretion of the part, the removal of the irritating cause will be sufficient to restore it to a healthy condition. It may, perhaps, in most cases be better to administer some saline purgative, and, if the inflammation do not

readily subside, apply several leeches to the gum situated below the painful part.

If the inflammation should be violent, and no measures taken for its reduction, the natural opening into the nostril becomes obstructed, by the swelling of the membrane which covers it and is, finally, entirely obliterated. The painful symptoms very soon increase, in intensity, in consequence of an excessive accumulation of the fluid within the antrum, and, in addition to the deep seated pain, already described, as attendant upon simple inflammation, in the cavity, a dull, heavy, aching sensation will be experienced, seemingly in the body of the bone, accompanied with occasional sharp, lancinating paroxysms of pain, darting across the cheek toward the nose, and toward the back part of the jaw. This is accompanied with swelling of the cheek, on the affected side, upon the skin of which circumscribed patches of red color will appear. The cheek is more or less painful to the touch and is found to yield slightly to pressure. The vessels, by which the fluid natural to the antrum is secreted, being excited in consequence of the inflammatory action, now pour it forth in increased quantity, until the cavity is, no longer, capable of retaining it. Pressure is exerted on all sides of its walls, through the thinnest part of which the fluid, eventually, makes its way. This is, generally, through the external face of the bone and cheek; but it, sometimes, makes an opening through the roof of the mouth, and has, occasionally, been known to burst into the socket of the eye.

The opening of the antrum is not, however, always closed, as a consequence even of violent and neglected inflammation of its lining membrane; this, indeed, may proceed to such an extent as to produce suppuration without causing so great a thickening at that part, which lines the opening, as to obliterate it. The pus thus formed is often of a very acrid character, excoriating the nostril on the side where it is discharged; it sometimes has an extremely fœtid odor.

The roots of the teeth, sometimes, penetrate the antrum, and a discharge of matter may come from an abscess, formed at the extremity of one of the roots, which has opened into this cavity.

Another consequence of inflammation, in the antrum, is ulceration and destruction of portions of its lining membrane, by which so much of the bony wall, as is bared, becomes dead, and is thrown off from that which is healthy.

We have, already, indicated the proper treatment for simple inflammation of the lining membrane of the antrum. But, after the natural opening, into the nose, has been closed, so long as to cause an excessive accumulation of fluid, in this cavity, no treatment will give relief till a way is made to allow this fluid to escape; and the sooner this is done the better. The usual, and most effective, method of opening the antrum, is to extract one of the teeth, situated under it, (in most cases, some of them will be found diseased,) and pass a sharp pointed instrument through the socket into the cavity. The tooth most proper to be extracted, for this purpose, is the first molar; but if this be sound, and any of the adjoining teeth, as far forward as the first bicuspid, decayed, they should be chosen in preference. This operation may appear very formidable to the patient, but it is accompanied with little pain, and the moment the opening is made into the antrum, the fluid is discharged, and an instantaneous mitigation of the symptoms, takes place. When this is done it will be necessary to keep the puncture, at the extremity of the socket, open, till the passage into the nostril is re-established; this may be affected by thrusting up a pledget of cotton into the opening. It will be necessary to remove this cotton several times, every day, to allow any fluid which may collect in the cavity to discharge itself. The cure may, sometimes, be assisted by the injection into the antrum, of some bland fluid, such as tepid water with the addition of some mild astringent. For this purpose a syringe, with a tube sufficiently curved

to pass, readily, through the opening, is used. In most cases this last remedy will be unnecessary as, by the evacuation of the fluid, the irritating cause is removed, and nature will restore the parts to a healthy condition.

It will be seen that, in the form of disease, above described, the cause of the disorder, is a simple inflammation of the lining membrane, which inflammation is increased in intensity, in consequence of an accumulation of fluid within the cavity; and that, as soon as this is allowed to escape, and any other irritating causes are removed, the parts would soon, of themselves, recover their healthy condition. In some cases, however, even though the natural opening of the antrum be not closed the lining membrane assumes a diseased character which requires more active treatment. If, however, it should not have become ulcerated, its restoration to health will not, in ordinary cases, be very difficult. Injections of a more stimulating character, to produce a change in the action of the parts, must now be used. In consequence of the highly inflamed condition of the membranes, which, under such circumstances, is generally, present, it will, in most cases, be necessary to wait a few days after the antrum is perforated, before this treatment is commenced: in which interval tepid water may, with advantage, be thrown into the cavity. If, however, without the use of these injections the parts are found to be regaining a healthy tone, it will be best, after the irritating causes have been removed, to let them alone. It is impossible to give any directions with regard to the strength of the injections, proper to be used; this must always depend upon the peculiarities of the case, and must be left to the judgment of the dentist. It is, generally, best to commence with a weak solution of the stimulating or astringent material which may be used, and, gradually, to increase its strength; being careful that it is not made sufficiently strong to re-produce inflammation. A solution of sulphate of zinc, diluted tincture of myrrh or port wine are recommended for this purpose.

It will, generally, be found that, as disorder of the antrum is relieved, the opening into the nostril will be re-established; this may be ascertained by observing whether the injections used, pass into the nose. The artificial opening, through the socket of the extracted tooth, should not be allowed to close till it is ascertained that this is the case. Some time may elapse before this is effected,—and cases are mentioned in which several years passed before the opening was re-established,—but, till this is the case, if the artificial opening be allowed to close, the return of the disordered condition of the antrum, for which it was made, will be certain.

In cases where, in consequence of neglect, an opening has been made in the cheek, the same caution must be observed, also, for this can never be cured unless the fluids, which form within the antrum, have free and ready egress.

When a simple abscess has formed at the root of a tooth, which penetrates the antrum, the removal of the diseased organ, will be sufficient to effect a cure, even if the whole of the lining membrane should have become affected.

Although, in the treatment of diseases of this cavity, the first step to be taken is the removal of any immediately irritating causes, the curative efforts should not cease till the whole mouth is placed in a healthy condition, by the removal of all the diseased teeth, of which there is no hope of preservation, and such attention to the gums, as will render them healthy. Cases are recorded in which every means, directed exclusively to the seat of the disease has failed, until this was done, to accomplish a cure.

Besides these disorders of the soft parts, in connection with the antrum, the bony walls, which form its boundaries, frequently suffer, seriously, from their effects. Inflammation of the lining membrane, as we have already stated, is sometimes followed by ulcerations more or less extensive, which always result in death of the bone proportionate to the destruction of the membrane. Those portions



of the bone which have, in this manner, lost their vitality can, no longer, be retained in contact with the healthy bone, forming the rest of its walls, and they are consequently sluffed off, in a manner similar to that in which dead sockets of the teeth are detached. When the dead portions of bone are found to be loose, they should be removed.

It is, sometimes, the case that, after extensive destruction of bone, in this manner, a permanent opening into the antrum, of considerable size, is left, when this occurs it should be covered by a plate of gold, attached to adjoining teeth; where artificial teeth are required, the same plate, to which they are attached, will suffice for this purpose.

Tumors of various kinds, from a soft abscess to those of a bony consistence, are sometimes formed within the antrum. Some of these are found to be very difficult to remove, calling for all the skill and tact of the most accomplished surgeon.

It is, sometimes, the seat of cancerous affections and also of that disease, still more frightful, because it is yet incurable, *fungus hæmatodes*. Although constitutional predisposition to diseases of this character, is necessary to their development, when they do occur, the exciting cause, without which the predisposition might never have been brought into activity, may often be traced back to a diseased tooth.

The professional reader, if this treatise should chance to fall into such hands, will perceive that we have given a most meagre account of these affections of the jaws, and the general reader, will, perhaps, if he should have gone over them, accuse us of dwelling too much in detail, upon a subject the consideration of which, at first sight, seems important to the dentist, only. A little reflection, however, will show to the one, that anything approaching to a minute and scientific view of the subject, it was impossible to take in this place; and to the other, that even this trifling amount of information, with regard



to these diseases, may be useful to him. It must, indeed, be gathered, from what little has been said, that a timely attention to the symptoms pointed out, the origin of which the patient might not, otherwise, be able to understand, may save him much suffering and, perhaps, fatal consequences. It is the wish of the author to impress, deeply, upon every one the great importance of meeting and combatting all these diseases, in their incipiency; and the necessity which appeared to him to exist, for a work of this character renders of very great consequence as clear and concise an account as possible of all the diseases, not only of the teeth themselves, but of those toward the production of which they, directly, contribute.

## CHAPTER X.

### EFFECTS OF A DISEASED CONDITION OF THE TEETH AND GUMS UPON THE GENERAL HEALTH.

In what manner the general health may be affected by diseased teeth—Injurious consequences of imperfectly masticated food—A vitiated condition of the fluids of the mouth injurious to the stomach—Disorder of the stomach, in consequence of an extension of inflammation along the mucous membrane, from the mouth—Cases—Effects of diseased teeth upon the lungs—Consumption—A case of consumption supposed to have been cured by the extraction of a diseased tooth—Epilepsy—Palsy—Tic douloureux—Cases—Necessity of examining closely the condition of the mouth, in cases of obscure constitutional disorder.

WE have made some allusion, in another part of this work, to painful affections of the teeth, symptomatic of disease in other parts of the system, near to, or distant from, them. Although this is a subject of great importance, as regards the preservation of the teeth, simply, one of vastly greater importance is to be found in a consideration of the effects of diseased teeth and gums, upon the general health; and we will endeavor to show, before leaving it, that these effects are much more common and serious than is, generally, suspected.

A necessary preparation to easy and healthy digestion of the food, in the stomach, is its perfect trituration and thorough admixture with the fluids of the mouth before it is swallowed. This is a fact insisted upon by all physiologists, and it has been satisfactorily ascertained that, in proportion as mastication is imperfectly performed, is digestion slow and difficult. One of the first effects of decayed teeth and inflamed gums, is to render this important act painful, and the food, instead of being reduced to a pulpy consistence, is swallowed in comparatively large, hard masses. The stomach is called upon for inordinate

exertion, in the performance of its peculiar office ; and this cannot fail, eventually, to impair its powers.

Besides the injurious effects produced upon the stomach, by imperfectly masticated food, the fluids of the mouth, in a vitiated condition, (in consequence of decayed and loose teeth, dead roots of teeth, inflamed and ulcerated gums, alveolar processes, dead, or with their lining membranes in a state of continued suppuration, or tartar accumulated in large quantities upon the teeth,) become greatly irritating to it. The fluids of the mouth perform an important part in the process of digestion. Their effect in assisting the more perfect comminution of the food may be readily comprehended. What part they perform, in the digestion of the food, in the stomach, is not so well ascertained, but it is, with reason, believed that their combination with the gastric juice, is of importance in assisting in the chemical changes there produced. That, in a vitiated condition, they cause more or less irritation of the stomach, cannot be denied.

Disorder of the digestive functions, in consequence of a diseased condition of the mouth, may be produced in another way. It will be remembered that the extremely delicate mucous membrane, which lines the mouth, is continuous in the stomach and throughout the whole course of the digestive tube. In membranes of this description, inflammation and disorder of various kinds, are sometimes communicated from one portion to another. The effects of difficult dentition seem to be an evidence of this; as disorder of the stomach, and the digestive organs, are nearly always amongst them.

The two following cases will illustrate what has been stated with regard to the effects of a diseased condition of the mouth upon the digestive organs. They are from works well known to the profession :

“ Case I.—Some years since, a lady came from a distant part of the country, to this city, in pursuit of medical aid, and placed herself under the care of Dr. Chapman. He found

her laboring under every symptom of obstinate dyspepsia, by which her health and strength were greatly impaired. His correct and well-known acumen, in the pathology of disease, immediately, led him into an inquiry into the state of her teeth and gums. He found that her gums were in a high state of inflammation, and that many of her teeth were loose and diseased. By the direction of Dr. Chapman, she applied to one of our most respectable dentists, and had her mouth and teeth placed in a healthy condition; and with the return of health in her teeth, gums, &c., every dyspeptic symptom left her, and she became quite well. After some time, (and the lady's health seemed confirmed,) she had a few artificial teeth placed in her mouth to supply some which she had lost, which either, from not being well adapted, and properly inserted in her mouth, or from some peculiarity in the lady's constitution, proved a source of irritation, and again brought on a return of the distressing dyspeptic symptoms, which compelled her to entirely dispense with the artificial teeth, when her health was again completely restored." \*

"Case II.—Mrs. S——, a lady of thirty or thirty-five years of age, with several children, in easy circumstances, rather delicate, and of sedentary habits, complained of derangement in the functions of the digestive organs, with much nervous disorder, and a painful sensation about the head, as if there were a pound weight on the top of it, with an occasional tightening of the scalp. This last sensation she compared to that which might be expected from having the scalp forcibly drawn together on the vertex, by the clawing of some animal with talons, as a hawk or falcon.

"Her friends, at first, thought but little of her complaints, and from their eccentricity, were inclined to believe them, for the most part, imaginary. The affection of the head, however, and the sensitiveness of the nervous system, evidently increased, until they became so harassing and acute

\* Fitch's Dental Surgery.

that they deprived her of rest, and made manifest inroads upon her healthful appearance. Medical advice having been now obtained, a regular and carefully directed course of purgatives was prescribed, but with little or no advantage. The cathartics having been discontinued, iron, bark, valerian, mineral acids, zinc, assafoetida, &c. &c. were next tried, to which were added frictions and tepid salt baths; but still without any material amendment.

"She began to have evident exacerbations of fever towards evening, which passed off with copious and debilitating sweats that much reduced her, and caused her countenance to assume a sickly aspect. She visited the watering places in the mountains of Virginia, but although her strength was somewhat recruited, the distressing symptoms, with some slight modifications, still continued. She was occasionally confined to the house, but generally able to take some slight exercise in the open air. This state of things had continued for eighteen months, when the attention of her physician was called to an abscess formed near the root of one of her incisor teeth. This brought about an inquiry into the general state of her teeth, of which the following is the result :

"Mrs. S——, at an early period, had bad teeth, which, since her marriage, had gradually been growing worse. A few years before the time of which I speak, two of the incisors of the upper jaw were clipt off close to the sockets, and artificial teeth were inserted in the usual way, on the fangs. Much pain, irritation, and swelling of the gums and lips, followed the operation, and similar symptoms occasionally occurred for a year or two afterwards, and were frequently attended with alveolar abscesses. The remaining incisors, of the upper jaw, and several of the inferior and superior molar teeth, were found to be in a dilapidated state. The alveolar processes, of several of the inferior molares, were partially destroyed, and one or two of their roots were turned on one side, and clung to the alveoli by the remaining integuments.

“The situation of the mouth rendered it quite probable that the ill health of the patient arose from the irritation produced by the bad state of her teeth; the more so, as her nervous system was exceedingly sensitive. She was persuaded to have the carious incisors, and the worst of the molars removed, and a short time after this was done, her health began to improve. The affection of the head and scalp soon ceased, the nervous symptoms vanished, and she is now in good health, and has a set of teeth decidedly more ornamental than those given her by nature ever were. The speedy restoration of her health, after the removal of her diseased teeth, justifies the conclusion that her bad health depended on the bad state in which these organs were found.” \*

These are, by no means, extreme cases, and show, very strongly, the importance, in the treatment of most diseases, especially of this nature, of directing attention to the condition of the mouth.

The general health may be affected in other ways than through the agency of the digestive organs. It is believed, with much reason, that the unhealthy exhalations from diseased teeth and gums, so vitiate the air which is breathed, as to produce a highly injurious effect upon the delicate structure of the lungs. A number of cases are on record, by which it is shown, that this has proved an exciting cause of consumption. In one case, mentioned by credible authority, in which the patient is stated to have died, from this terrible disease, its first appearance was traced back to a period when great irritation was caused by a diseased tooth, which produced extensive disorder of the mouth. In this case it is stated that, in the family of the individual in question, no predisposition to consumption had existed. Dr. Rush quotes a case, from a French writer, in which consumption is said to have been cured by the extraction of some diseased teeth. The same celebrated physician

\* Harris' Principles and Practice of Dental Surgery.



mentions a case of epilepsy, and one of rheumatism, produced by decayed teeth.

But very common, and, certainly, not the least to be dreaded effects of diseased teeth, are those horrible nervous affections, mostly confined to the face and head, which are known as *tic douloureux*. This is the French name for a disease which is known, amongst physicians, as *neuralgia*: a term which implies a painful affection of the nerves. These disorders have their origin, in a great many causes, some of which are, at present, very imperfectly understood. But, however much they may depend upon general causes, they are frequently produced by the teeth. Of cases of this kind a large number are on record.

A case is mentioned, by a distinguished writer upon dental surgery, of a gentleman who was, for a long time, afflicted with an excruciating pain, which attacked, in paroxysms, his ear, and would then dart down the neck and shoulder, and through the whole length of the arm, so as, considerably, to diminish the power of the hands and fingers. He had, for a long time, been under the treatment of a distinguished medical practitioner, who had used all the remedies, within his knowledge, without being able to afford the slightest relief. Upon applying to the gentleman, who reports the case, it was found that the roots, of a molar tooth, which had been broken off several years before, were much diseased, and producing considerable irritation of the surrounding parts; pressure upon them caused great aggravation of the painful symptoms. As soon as they were extracted, the pain in the ear and arm entirely ceased.

The same author mentions a curious case which, also, came under his notice. He was consulted by a gentleman who had been, for some time, affected with a slight degree of loss of power in his right arm, accompanied with pain, of that peculiar tingling kind, which is produced by pressure upon a nerve. He observed, finally, that one of these attacks was accompanied with an acute shooting pain in a lower molar tooth, of the same side. Upon a more atten-

tive observation of the circumstances, attendant upon subsequent returns of the pain, he found that the sensation in the arm was produced whenever the tooth was pressed upon, or irritated. The tooth was extracted and the affection permanently cured.

These cases serve to illustrate what has been said with regard to the sympathetic connections of the teeth with other parts of the body. It would be fortunate, indeed, if the effects were never more serious or distressing. The following is the substance of a case which came under the care of Dr. Koecker, formerly of this city, and now of London.

The patient had suffered, for ten years, with all the horrible symptoms of this distressing malady, (neuralgia). His whole frame, and, particularly, the glandular system was affected with swellings and indurations, accompanied with great pain. But its effect, upon his head was of such an agonizing character that he declared he had often implored heaven to relieve him of his sufferings, by putting an end to his miserable existence. He had placed himself under the treatment of the most distinguished physicians, without being able to find any relief. He was, at last, recommended by an eminent surgeon, who suspected that his teeth might have some agency in the production of his malady, to consult Dr. Koecker. He did so, and his mouth was discovered to be in very bad condition. A number of his teeth were much decayed, there was a large accumulation of tartar upon them, and his gums were in a highly inflamed condition. He was at once subjected, by this judicious practitioner, to a most thorough course of treatment, by which the health of his mouth was re-established. In less than a month after he was restored to perfect health.

It is unnecessary to multiply these cases, of which a very great number might be cited, those already given are sufficient to show the great importance of attention to the condition of the teeth, in many cases of constitutional or

local disorder. Physicians, at the present time, indeed, are more disposed, than they formerly were, to take the circumstances of diseased teeth and gums into consideration, in examining obscure cases of disease. Greater attention than they, even now, give, is certainly desirable, and it is to be hoped that a portion of the laudable spirit of searching inquiry which, at present, characterises the medical profession, will be directed into this channel. In the extreme cases, which we have cited, the morbid effects of a diseased condition of the mouth are strongly apparent, but who can, at present, appreciate the influence which they may have in producing those slight, and frequently recurring, disorders of the system to which so many persons are subject. There are very strong grounds for believing that many of the distressing sick-headaches and other complaints, of like character, to which females are so commonly subject, may, at times, have their origin in this cause; and it is the well grounded opinion of many learned and scientific medical practitioners, that a single diseased tooth cannot remain in the mouth without, in a greater or less degree, affecting the general health.

## CHAPTER XI.

### ARTIFICIAL TEETH.

Importance of the preservation of the natural teeth—Necessity of supplying their loss—Artificial teeth—Do they answer all the purposes of natural teeth—A thorough knowledge of dental surgery necessary to fit a practitioner for the proper insertion of artificial teeth—Way in which dentists are frequently self-made—Impossible that the practice of any one can be confined, exclusively, to what is called the mechanical branch—Pivoting method of inserting artificial teeth—Preparation of the root—Porcelain teeth best adapted for this purpose—Human artificial teeth—Objections to them—Pivots—The operation, if properly performed, but slightly painful—The most excruciating pain may be given—The amount of pain a patient should expect to suffer—Injurious consequences of unskilful insertion of these teeth—Pivoting method applicable to none but front teeth, and to these when the roots are remaining, only—Insertion of teeth upon plate—Method of making and fitting the plate—Manner of fixing the artificial teeth to the plate—Methods by which the plates are secured in the mouth—Clasps—Spiral springs—Atmospheric pressure—Injurious effects of artificial teeth improperly inserted in this manner.

WE have attempted, in the preceding portions of this work, to point out some of the causes which produce diseases, of the teeth, and mouth, and the means usually adopted for their cure. If these directions were always faithfully carried into practice, the mouth might, generally, be kept in a healthy condition, and the teeth preserved till the end of life, or till that period, at least, when in the order of nature they are lost. That all these diseases may be prevented will be shown in the following chapter. It is scarcely to be expected, however, that the attention of the community, at the present time, at least, will be so generally directed toward this object, at so early a period as to prevent disease, or to arrest it when it first makes its appearance; and, regarding the qualifications of a large number of those who are

now engaged in the practice of dental surgery, it must be seen that many, who are anxious to make the most of what can be done for them, by its aid, will be deceived by those in whom they place confidence, and will suffer more, in consequence of improperly performed operations, than from disease itself. Losses of the teeth at an early age will, therefore, be common, and although the dentist who contributes most toward the preservation of the natural teeth, must be regarded as performing the most important uses in his profession, the means of supplying such losses, in the most perfect manner, is a subject of very great importance.

The effect of a loss of the teeth, upon the personal appearance, although by no means the most important consideration, is not to be disregarded. No feature contributes more to the expression of the countenance than the mouth, and nothing contributes more to the beauty of the mouth than a clean, healthy, regular set of teeth. This, however, no argument is required to establish, and, as regards artificial teeth, we have never seen any reason why we should not use every means, not injurious to the general health, which will render our personal appearance as agreeable and attractive as possible, to those with whom we are thrown into contact.

But there are other considerations which would make a loss of the teeth, if it could not be remedied, a very serious matter. Mastication, under such circumstances, must be imperfectly performed, and the injurious consequences of the imperfect performance of this act have been, already, pointed out. Besides this the front teeth are, absolutely, essential to perfect and clear enunciation. They, also, assist in the retention of the saliva, in the mouth, in the act of speaking.

But, it will be asked, can artificial teeth be made to supply perfectly the loss of the natural teeth? This is scarcely to be expected; but this branch of the dental art has, at the present time, reached such a degree of perfec-

tion, that artificial teeth may be made to resemble the natural teeth so closely, in appearance, as to elude the closest scrutiny of a common observer, and to subserve, to a considerable extent, all the requisite purposes of mastication. But that the dentist be enabled to effect these objects it is essential that he should have an intimate knowledge of the principles of his profession.

It is a very mistaken impression, which has gone forth into the world, that all that is requisite to constitute a good dentist, and especially as regards this part of the practice, is a certain amount of mechanical ingenuity. No matter how ignorant he may be of the most common principles of physiology, and disease, if a man be able to make a bungling attempt at the construction of a watch, or has soldered a broken ear-ring, there is a class of the community who are struck with the mechanical talent he has displayed, and think that he will make an admirable dentist. And this is dinned into the ears of the artist, till he becomes so well convinced of his ability, that, at last, he acts upon the suggestions of his friends, and commences the trade of inflicting irreparable injuries upon those who are so unfortunate as to be impressed with a conviction of his ability. Incredible as it may seem, we once heard that a dentist, in a neighboring city, was extensively patronised, because, without any instruction, depending entirely upon his extraordinary genius, he had relinquished his occupation of barber, and entered upon the practice of dental surgery! The lady who mentioned the fact to us, had called upon him to have a tooth extracted, convinced, in consequence of the extravagant recommendations of her friends, that he knew every thing about the profession into which he had thrust himself. It was a case in which a temporary molar tooth had remained in the jaw till an unusually late period, but which any dentist, at all qualified for the practice of his profession, would at once have recognized as one of the first teeth. The roots of the tooth, by the natural process, were absorbed, and when he



attempted to extract it and found that the crown came away, without the root, he imagined he had broken it off, and actually continued, for nearly an hour, during which time the individual suffered the most excruciating torture, in an attempt to extract, what he supposed to be the roots of a second tooth, but what was, in reality, a forming tooth of the second set. After enduring the most horrible suffering, for this length of time, she refused to let him continue his attempts any longer, left him, and, in a few months after, the new tooth made its appearance, the fractured enamel of which gave evidence of the violence of this fellow's attempts to extract it.

The preparation of sets of artificial teeth, as will be presently seen, requires a knowledge of many of the manipulations common to a jeweller; and this has, undoubtedly, been the means of introducing more of the incompetent practitioners, which now encumber the profession, than any other cause. A practical jeweller may be better qualified to attend to the details of the construction of a set of artificial teeth, than many excellent practitioners of dental surgery, and they are frequently called upon for that purpose. By this means they may obtain some of the least important knowledge, and imagine, at once, that they know as much, and a great deal more, perhaps, than those who employed them, under their especial direction, to exercise their art. We have known such a man without, perhaps, ever having opened a book or consulted any one, who could give him information with regard to the subject, remove to a part of the country where he was unknown, and announce himself as a dentist. This has, by no means, been an uncommon occurrence, and that such persons should succeed in getting a practice arises, in a great degree, from this fact, that if they can insert teeth which present a pretty appearance—and very little knowledge, indeed, is requisite for this—what they have done can be seen, and as the greater portion of the community are unable to judge whether it is well done or not,

they are attracted to his establishment. If in a very short time they fail, or the rest of the teeth suffer, in consequence of their presence, it is attributed to the unavoidable effect of artificial teeth, and he is employed to renew what he has already been paid for doing badly. A very inferior practitioner, if he have any taste in the selection of teeth, may insert a set which, for a short time, will look as well as those applied by the most skilful dentist. And time, without a comparison can be instituted between the two cases, will only have the effect of convincing those, who have suffered imposition, that no confidence can be placed in the representations of dentists, generally, and that there is little utility in what they do. It is from no desire to exaggerate the importance of the profession in which he is engaged, that the author insists, so strenuously, upon more extensive knowledge, that is generally thought necessary, to qualify an individual for its practice. It may be thought, by many, that this branch, at least, of the practice, may be as readily and perfectly accomplished without any thing more than a knowledge of the mechanical manipulations, but that this is not true (even if the practice in such a case, were confined, exclusively, to that branch, known as mechanical dentistry, which never can be the case,) will become sufficiently evident in the course of this chapter.

A dentist is rarely ever applied to, for the purpose of preparing a set of artificial teeth, without the mouth of the individual, who makes the application, is in a more or less diseased condition. With the exception of those persons whose teeth have dropped out, from disease, or old age, and whose gums have had sufficient time, after the loss of the teeth, to become healthy, this is always the case.

The first thing to be done, then, and this is most essential, is to put the mouth in a perfectly healthy condition. Such teeth as are too much decayed to be saved, by the operation of filling, should be extracted, even if they are not to be replaced by artificial teeth. The tartar, if any

is present, should be removed, and the gums subjected to the proper curative treatment; in short, all operations must be performed, which can, in any way, contribute to the removal of every vestige of disease from the mouth. And it is not only necessary that the mouth should be in a healthy condition, the general health, also, should be cared for.

There are two methods, at present, in common use, of inserting artificial teeth. Fixing them, by means of pivots, in the natural cavities of the roots, after the crown has been removed, and attaching them to a plate, placed against the gum, after the roots, of the teeth, are lost.

The first is called the pivoting method, and is adapted, exclusively, to the incisor and canine teeth of the upper jaw. When one of these teeth is found to be too much decayed to be saved, and the patient determines to have its loss supplied with an artificial tooth, any portion of the crown which remains should be filed as nearly through as possible, close up to the gum, and then cut away, by means of a pair of forceps, adapted to the purpose, with cutting edges. The shock produced by this operation, which will be greater or less in proportion to the thickness of the remaining portion of the crown of the tooth, will, in some degree, lessen, for the moment, the sensibility of the pulp which fills the central cavity. This, however, will return in a very short time, and, as soon as the pulp is fully exposed, a very fine silver or untempered steel wire should be thrust suddenly into it. The sooner this is done, after the tooth is cut off, the less will be the amount of pain experienced. The pain, however, under the most unfavorable circumstances, is over in an instant. It may be necessary, in some cases, to destroy the pulp, previously to cutting off the tooth, in the same manner as in preparing it for filling. The single thrust of the instrument, however, into the body of the pulp, instantly destroys all sensibility, and it may then be removed at pleasure. After this is done, all the pain attendant upon the operation is

over. A properly shaped file should now be used to cut down the projecting part of the root, of the tooth, a little below the free edge of the gum, and so shape it, that the artificial tooth, which is to be placed upon it, will fit perfectly. When this is effected the root will be slightly arched, so as to resemble the lower edge of the gum. The canal, in the root, must now be enlarged, with a suitable drilling instrument, till it is about the twelfth part of an inch in diameter, and from about an eighth to a half inch deep. After the pulp is entirely removed, it will, in most cases, be better to wait several days, for the irritation attendant upon this operation, to subside, before the artificial tooth is placed upon the root. By adopting this precaution, much future trouble may be avoided.

A tooth should now be selected bearing the closest resemblance, in color, to the adjoining teeth, and of the right size and shape, required to give it the most natural appearance. It must always be remembered, that the principal object to be kept in view, in the insertion of artificial teeth, is, to select, not those which are whitest and most beautiful of themselves, but such as resemble most nearly the rest of the teeth.

The kind of artificial teeth, far preferable to any others, in use, are those made, principally, of porcelain, and commonly known as mineral or incorruptible teeth. Within a few years the improvements, in the manufacture of these teeth, have been so great as to render them so nearly like the natural teeth, in appearance, that, when placed in the mouth, in a skilful manner, they can rarely be detected, except by an experienced eye. Various other kinds of artificial teeth have been used, and amongst them the human teeth, which, to some extent, are still employed. The human artificial teeth, when first inserted, resemble, exactly, of course, the natural teeth, but the greatest objection to them is, that they decay, under most circumstances, with the greatest rapidity, and require to be frequently renewed. It seems to us that the porcelain teeth

are applicable, in all cases, where these are used, and may be made to look nearly, if not quite, as well.

Fig. 24 represents a front and side view of a pivot tooth, with the pivot, which is inserted in a small hole, in the upper part.

FIG. 24.



The best pivot, in use, is made of thick gold, wire, encased in well seasoned white hickory wood.

After having found a suitable tooth—in the selection of which the operator will be assisted by attaching it to the root, with a pivot of soft pine wood—and ascertained the exact size of the pivot required, he should fix it, firmly, into the hole in the artificial tooth, and then press it up into the prepared root, with his finger and thumb. The pivot should go into its place without the use of much force, and yet it should fit closely; the moisture of the mouth will cause the wood encasing, of the pivot, to swell, in a little while, so as to give it the requisite degree of firmness. A very reprehensible practice is sometimes pursued, not to so great an extent, at present, however, as formerly, of using a small hammer to drive the artificial tooth into the root; this should never be permitted, for, if the pivot fits too tightly, at first, it is apt to split the root when the wood, encasing it, expands. It may be permissible, under some circumstances, to give the tooth a slight tap, with the hammer, at the close of the operation, to be sure that, to use a common expression, it is home.

If the root is in a healthy condition, and this will generally be, if, in preparing it for the insertion of the artifi

cial tooth, it is necessary to remove the pulp, inconvenience will rarely ever be experienced afterward, if the tooth is properly inserted. But, if the "nerve" of the tooth have been dead, for any length of time, it is likely that a discharge—similar to that which we have described as sometimes taking place in the cavity of a decayed tooth—is present, and then it will be necessary to cut a groove, either in the pivot itself, or in the root alongside of the pivot, to allow the matter freely to pass away. This discharge may, sometimes, come from a minute remaining portion of the pulp toward the extremity of the root, and will be cured if this be taken away. This cannot, however, always be depended upon, and if there should be any discharge from the root, subsequent to the insertion of the tooth, and the groove is made, as directed, the same result will follow as that, which is a consequence of filling a tooth in the same condition. In the general ignorance with regard to this subject, persons may be, and are, induced to believe that the pain they experience is an unavoidable consequence, and, instead of having the cause removed, at once, they will bear, for several days, the most excruciating pain, in the hope that it will soon cease, and that they may be able to wear the new tooth with comfort. If two or three days of extreme suffering were the greatest injury they would be likely to experience, the necessity for such a warning as this would not, perhaps, be so great. But, as we have already shown, such an apparently trifling cause as this may produce or bring into activity fatal disease. A case came within our own knowledge, of a young lady who had a tooth inserted upon a root, in the condition here described, without experiencing pain at the time; but, a few days after, inflammation, which extended itself rapidly to the adjoining parts, was excited, and, after suffering the most horrible torture, lock-jaw ensued, and death, only, put an end to her sufferings. In this case injurious consequences could have been easily avoided, if the operator had been aware that a discharge was taking place, from the root, and



had left a vent for the escape of the pus, or, if he had directed the patient to have the artificial tooth removed, the moment she experienced any pain in the part.

It will be at once seen that, in such cases, the injurious effects which follow this operation are, invariably, a consequence of its unskilful performance; and, notwithstanding the fact, that the means of preventing such consequences are very simple, the fact that, although rarely terminating fatally, as the one above mentioned, they are constantly recurring, gives evidence that these means are unknown to, or disregarded by, many who are engaged in the practice of dentistry. The usual result, in such cases, is formation of alveolar abscess.

In submitting to this operation, the patient, who has read the above account of the manner in which it should be performed, will know that all the pain, attendant upon it, is past, the instant the pulp, lodged in the central cavity and canal, which leads from it, is removed. This is so easily done that every one would suppose, that the most ignorant person, who had ever taken an instrument into his hand, could not help stumbling upon the proper manner of effecting it—that he could not avoid removing the nerve at the first effort he made to prepare the root for the pivot. But the canal, as was shown in that part of the work devoted to the anatomy of the teeth, becomes rapidly smaller when it leaves the cavity of the crown; if the instrument used to destroy the nerve is not fine enough to pass at once almost up to the extremity of the root, so much, only, of the pulp, as it reaches, will be destroyed, whilst all the portion which remains, will still retain its extreme sensibility. If an instrument be now used, for the purpose of enlarging the canal, every movement made, with it, will produce pain quite as excruciating, as when the whole nerve is taken away at once; and this will continue till the whole operation is completed. We have heard patients say that, for more than an hour, (and in such an hour we may conceive of the concentration of a life time of or-

dinary suffering,) they have borne the most horrible torture. But, what is still worse, the injury inflicted does not generally terminate with the operation, for the operator, who is not sufficiently well informed to know that it is proper to take this preliminary step, in the insertion of a pivot tooth, cuts away at the root, either till the patient is unable to endure the pain, any longer, or till he thinks the hole he has made is large enough to hold the pivot. He then thrusts the pivot in, upon the remains of the pulp, and all the consequences we have described, as following the pressure of a plug, upon an exposed "nerve," ensue. An abscess is invariably formed, at the extremity of the root, after a great deal of pain has been experienced, and the extraction of the root soon becomes necessary.

This method of inserting artificial teeth, though a very elegant one, as far as appearance is regarded, has objections. It is, at best, but temporary, as the roots upon which they are engrafted are lost, sooner or later; generally in from four to ten years. We have known instances of their having been retained as long as twenty years, but these are rare, indeed. It is impossible to remove and cleanse them, and, no matter how accurately the artificial tooth may be fitted to the natural root, the fluids of the mouth, and particles of food, cannot be entirely excluded; and, here, decomposed, they become offensive.

The pivoting method of inserting artificial teeth is applicable to none but the front teeth, of the upper jaw, and to these when the roots are remaining in a sound condition, only. This method of supplying losses of the teeth is so simple, and easy of accomplishment, that it may be readily supposed that it would have been the first resorted to. It has, indeed, been practised for a long time, but, from the fact that teeth inserted, in this manner, answer, at best, but a temporary purpose, and that the teeth which cannot be so replaced, are liable to be lost, a different plan of securing them in the mouth, became desirable. To effect this purpose, various other methods have, from time to time, been

employed: such as securing them with ligatures to the adjoining teeth, transplanting a sound tooth, just extracted, from the jaw of another individual, to the socket of a decayed tooth, just removed from the mouth of the patient, &c.; but these, on account of many and insuperable objections, have given place to that which we are about to describe.

The method, now in use, of inserting artificial teeth, after the natural roots have been extracted, consists in attaching them to a plate of suitable material, the broad surface of which rests against the gum. In this manner, any number, from a single tooth to an entire set, may be applied, in such a manner as to answer, quite well, the purposes subserved by the natural teeth.

The first step toward the preparation of the mouth, for this purpose, is the extraction not only of the roots of such teeth as are to be replaced, but all that can, in any manner, affect the health of the mouth. A sufficient length of time should now be allowed to elapse, not only for the gums to heal, perfectly, but for entire absorption, of the sockets of the extracted teeth, to take place. This will, of course, depend upon their condition, and the time required may vary from three or four to twelve months. The patient should always remember that the greater the time allowed to elapse, up to a reasonable period, after the removal of the natural, before the application of the artificial teeth, the greater will be the probability that the latter will be durable and comfortable to the mouth. The operator should never allow himself to be induced to insert artificial teeth, after it has been necessary to extract the roots, before the requisite time has elapsed, to render his work durable, without first warning his patient of what he is to expect; and the patient should never throw any blame upon the dentist, when he has not been willing to follow his advice, in this respect, if he find, in the course of a few months, after his teeth have been inserted, that they no longer fit accurately. It is better to have a temporary set

made, even if they are not otherwise useful—than to enable him to speak distinctly, and obviate the unpleasant appearance of the absence of front teeth—than to insist upon the too early application of such as are intended, in many cases, to last throughout life.

After it is well ascertained that the sockets of the teeth have been entirely absorbed, so that there cannot be any further sinking of the gums, an exact impression of the gum, or of that part to which the artificial teeth are to be applied, is taken by pressing against it a sufficient quantity of softened wax, placed in a frame adapted to the purpose. From this impression the dentist makes a cast of plaster of paris, which is an exact model of the mouth. From this model he procures a brass casting of precisely similar form. He then prepares a ladle full of melted lead, into which he dips the brass casting, and allows it to remain till the lead becomes cold. The brass casting is then withdrawn, from the lead, in which it leaves an exact impression of all that part corresponding to the vacancy in the mouth caused by the loss of the teeth. The plaster model is now taken and a piece of gold plate cut out, as nearly as possible the form of the gum, where the teeth are to be supplied, and allowed to extend about half an inch, more or less, as the case may require, toward the inside of the mouth. This plate is now hammered, and bent with a pair of pliers, so as to give it something of the proper form. It is then carefully adjusted between the two metal castings, the brass one of which is struck several times with a heavy hammer. When the casts are separated it will be found that the plate has taken the exact form of the model, even to its most minute elevations and depressions. The plate, at this stage of the process, should be tried in the mouth of the patient, and, if the wax impression have been accurate, it will fit, closely, the part of the gum for which it is intended. If we were always certain of the accuracy of the wax impression, this part of the process would be unnecessary for there being an exact counter-

part of the gum it would, necessarily, fit perfectly. It is impossible, however, to be certain of this, even when the greatest caution is observed; for, unequal pressure, contact with the lips or remaining teeth, in withdrawing it from the mouth, in its softened state, will be sufficient to render the wax model more or less imperfect. If the plate is not found to fit the gum, closely, and accurately, in every part, and it cannot be made to do this, with a little alteration, it should be thrown aside, the process re-commenced, and another plate made. The patient may know when the plate fits, accurately, by feeling with his tongue, that there is not the slightest space between its edges and the inside of the mouth, or between them and the gum, externally; by observing that pressure upon one part does not cause some other part to raise, and that, if attached to natural teeth, it produces no sensation of pressure, in them, either toward or from the plate.

After a plate is made to fit, accurately, the next step is to select suitable teeth and arrange them upon it, in the best order. In selecting the teeth reference should always be had to the precise shade of the adjoining teeth, if there be any, to the color of the lips and complexion, and to the color and condition of the gums. As has been already remarked, the beauty of artificial teeth does not consist in their whiteness, but in their adaptation, both in color and size, to each particular case. The selected teeth are arranged upon the plate, which is placed in its proper situation, upon the plaster model, by putting them up against a roll of softened bees-wax, which is fixed to the plate. The whole of the teeth will, in this manner, be temporarily attached, in their proper places, and, with the wax, should now be tried in the mouth, so as to ascertain whether there are any defects in their arrangement, color or size. It is important that the whole piece should now be examined, closely, for, if any defects exist, they may be more easily remedied at this than at any subsequent part of the process. The teeth used, for this purpose, are



each furnished with two small platina rivets, which with the form of the teeth are shown in Fig. 25, representing a back and side view of one of the incisor teeth.

Fig. 25.



To these rivets are attached a piece of gold plate, previously perforated with holes, for the purpose, of sufficient size to cover the greater part of the surface of the back of the tooth. This backing is the means of union between the artificial teeth and the plate. After the backs are fixed to the teeth they may, again, be attached to the plate with the aid of the wax, and again tried in the mouth, as this is the latest stage in the process, at which any alterations can be made in their arrangement. Any defects which may now become apparent should be corrected.

The whole piece, consisting of the plate, wax and teeth, should now be placed upon a piece of charcoal. To the charcoal it is secured by pouring around, and partially above it, care being observed not to cover the wax, a thick coating of plaster of Paris. After the plaster becomes hard the wax is warmed, and carefully removed. The backs of the teeth, with their points of contact, with the plate, are now fully exposed. Small pieces of gold solder, wet with a solution of borax, are placed at the point of junction, and fused by means of a strong flame, thrown upon it, from a properly constructed lamp, directed by a blow pipe. When the plaster becomes cold it may be removed, and the teeth will be found as firmly attached, as if the gold backings were continuous with the plate. The teeth, with the plate, are then thrown into dilute sulphuric acid, in which they are allowed to remain a short time,



for the purpose of cleansing the plate. After having been in the acid sufficiently long, to accomplish this, they are taken out, and washed with soap and water; after this is done the plate is brightly burnished and polished. It is now ready for the mouth, and, if all the precautions recommended have been observed, little difficulty will be found in adjusting it. The patient will, however, even when the set is constructed in the best manner, find them, at first, somewhat awkward, and uncomfortable, but any inconvenience, of this kind, will pass away in a few weeks.

Thus far we have attempted to describe the manner in which the porcelain teeth are attached to the plate. In all cases the manner of attaching single teeth, of this description, is the same. But, in some cases, in consequence of great absorption of the gum, it is necessary to insert teeth with artificial gums. These it is often necessary to construct in blocks of as great a number of teeth as are required. The blocks are made with holes pierced through them, and they are fixed to the plate with rivets. We have said nothing, however, of the manner in which they are secured in the mouth. This is effected in three ways; with clasps, passed round adjoining teeth; with spiral springs; and by the aid of atmospheric pressure. The first is adapted to those cases only, in which a part of the teeth have been lost, and those which remain are healthy and firm; the second may be applied with the assistance of clasps to partial sets, or exclusively to entire sets; the third is used for entire upper or lower sets, or both.

In proceeding to insert teeth, by the first of these three methods, the steps already described, for procuring an accurately fitting plate, must be taken. As soon, however, as the plate is made to fit, the clasps should be attached to it. These clasps are merely strips of plate, somewhat thicker and more elastic than that upon which the teeth are set. They are intended to embrace such of the adjoining teeth

as are strongest and firmest. Fig. 26 represents a set of artificial teeth, for the upper jaw, as far back as the second bicuspid, attached in this manner, to the first molar teeth of each side.

Fig. 26.



The clasps should be broad, strong and elastic, so as to embrace the natural teeth, firmly, without preventing the easy removal of the artificial set. Although the teeth next adjoining the space to be supplied with the artificial set are, generally, the most convenient, it is not always proper to make use of them, alone, for the purpose of attaching it; for although they may not be diseased, they may want the requisite degree of firmness, and may be entirely pulled out of their sockets by the weight of the artificial apparatus. It may be necessary, in some cases, to secure the clasps to more than one tooth, on each side of the artificial set. With regard to this matter a great deal of judgment and experience is necessary, for there are few causes, more destructive to the natural teeth than artificial teeth improperly attached in this way. After clasps of a suitable kind and size are made, and tried in the mouth, to ascertain that they fit the teeth, to which they are to be attached, the artificial teeth are secured to the plate in the way above described.

The pernicious practice, sometimes pursued, of inserting teeth in this manner, without extracting the roots of such as are to be replaced, cannot be too much deprecated. If the roots are not sufficiently strong and healthy to support pivot teeth they ought, almost invariably, to be extracted. A plate can never be made to fit accurately, over them, for any length of time : for as they decay, and this they will certainly do, the gums will always sink to a greater or less extent ; a space will then be left, between the plate and the gum, into which particles of food are lodged, which undergo decomposition, and become exceedingly unpleasant to the patient, and offensive to all who come near him. The tendency to serious affections of the gums, under such circumstances, is greatly increased, and but a short time will elapse before it will be found necessary to remove these sources of disease ; a new set of artificial teeth, such as ought, at first, to have been inserted will then be required. Artificial teeth attached to a plate are, sometimes, fastened to one side of the mouth, by a clasp, and to a root of some one of the front teeth, by means of a gold pivot fixed to the plate. The same objections urged against the insertion of artificial teeth, in the manner just described, hold good here, also, with this additional one : that when inserted, in this way, they cannot at any time be removed for the purpose of cleansing them. No such course as this, it seems to us, can, with advantage, be adopted. If the roots, as we have already said, are not suited for the insertion of pivot teeth, in the ordinary manner, it will be better, in nearly every case, to extract them. That this is the most proper course is, at least, our own experience.

Spiral springs are used for the purpose of exerting a constant pressure, of the plates, against the gums, upon which they rest. Till within a few years past it was, exclusively, used in the construction of entire sets of teeth, and it is still, in many cases, necessary. In the accom-

panying drawing a double set constructed in this manner is shown.

Fig. 27.



This spring is useful in cases where, in either jaw, all the molar teeth, of one side, are lost, and those of the opposite side, which is generally the case, are not sufficiently strong to bear the weight of the artificial set. If, in the upper jaw, it is carried down from the plate and fastened to one of the molar teeth in the lower jaw. The plate for the upper jaw should be about an inch in width; that for the lower jaw need not be so wide, but it may with advantage be thicker.

The third method of inserting teeth, by the aid of atmospheric pressure, is of late introduction; but, in a great many cases it is found greatly superior to any other. By it the use of spiral springs which are often awkward, and to some persons quite uncomfortable, is entirely dispensed with. The principle is quite simple and obvious. The pressure of the atmosphere upon a broad plate, so accurately fitted to the smooth surface of the gum, that all the air, underneath, may be perfectly withdrawn, is found to be amply sufficient to retain the artificial apparatus, firmly, in its place. Artificial teeth can only be applied, in this

manner, with any hope of success, when the whole of the teeth in either jaw are lost. It will always be found that they may be more readily fitted to the upper, than to the lower jaw, from the fact that it presents a broader surface over which the plate may be extended. It may be, however, and is, successfully applied to the lower jaw.

Greater care is required in the adaptation of a plate, intended to be retained in the mouth in this manner, than any other; it must fit with perfect accuracy or it cannot be kept in its place. It will be found, that, in many cases, a plate constructed upon this principle, however carefully it is made will not fit, when first put in the mouth; this, however, should not be sufficient to induce the patient to condemn it, nor the dentist to despair of success. It often happens that, in the course of a few weeks, the gums become so well adapted to the plate, even if it do not, at first, fit perfectly, that it may afterwards be worn with comfort. When the teeth have been extracted, previously to the preparation of a set of teeth, constructed on this principle, it will be much more necessary to wait until the alveolar processess are perfectly absorbed, than when they are attached by any other method, for, no matter how slightly the gums may fall, after the plate has been applied, it will be sufficient to render the set useless.

We have said a few words of injuries resulting from the improper insertion of artificial teeth by the pivoting method; but the consequences of the unskilful application of teeth upon plate, fastened by means of clasps are still more destructive. We have seen cases where the natural teeth, to which an artificial set was attached, were entirely cut off, by the clasps, in consequence of their improper construction and adjustment.

If the plate fits well, and the clasps are properly constructed and attached to the teeth, the pressure exerted by them will not be sufficient to do any material injury. It

should, indeed always, be an insuperable objection to a set of teeth, secured in this manner, if a sensation of pressure, in the natural teeth, to which they are attached, should be experienced. It is often the case, when it is found that the artificial teeth do not fit closely, that the clasps are drawn very tightly, on each side, to keep them in their place. By this means such teeth will be moved toward the artificial set, which will then, of course, become loose. The clasps will require tightening again, new pressure will be exerted, the natural teeth will be drawn more toward the plate, till at last they lose their attachment, and can no longer be retained in their sockets. The artificial set of teeth will, then, have become useless, and a new one will be required; but if the clasps are fitted, in the same way, to other teeth, they will share the same fate. In this way may a single artificial tooth, unskilfully applied, effect the destruction of the whole natural set.

If the plate should be placed over diseased roots, violent inflammation of the gums and its injurious consequences will be likely to ensue.

There are a great many ways in which artificial teeth, unskilfully applied, may cause serious disorder of the mouth, and as a consequence the general health; it was our intention to have treated the subject more in detail, but this, the space taken up with the account of the methods of constructing and inserting them, precludes; this account, however, will in most cases, it is hoped, enable every person, interested, to discover any material defects in them.

The patient should remove the plate, with the artificial teeth, sufficiently often to keep them in a cleanly condition. They should never be fastened so tightly that this cannot be done with ease. Two or three times a week will generally be sufficient. When removed, the teeth, to which the clasps are attached, should also be thoroughly cleansed with the brush. The artificial set



may be washed with soap and water, with the aid of a brush, and may, occasionally, be thrown into some dilute sulphuric acid, in about the strength of a tea-spoonful of the acid to a tumbler of water. It will be well to have the mouth examined, occasionally, so as to detect, in time, an attack of decay upon the teeth to which the clasps are attached; as these perhaps are, under the most favorable circumstances, more or less predisposed to disease.

## CHAPTER XII.

### PREVENTION OF DISORDERS OF THE TEETH AND MOUTH.

Directions for this purpose resolved into two: attention to the general health, and cleanliness of the mouth—In all efforts, for this purpose, reference must be had, distinctively, to the causes of disease—Prevention of decay of the teeth, with reference to the predisposing causes—Teeth and mouth, of the infant, to be kept clean—Importance of preserving the first teeth—Children should, at an early age, be brought into the habit of using a suitable brush—Material useful for cleaning the lateral surfaces of the teeth—Care to be taken for the prevention of irregularity—To be corrected when it occurs—Improper to file teeth for this purpose—Importance of especial attention to the teeth, from the sixth to the fourteenth year—The tooth brush—Importance of its daily use—Dentrifices—Simple water—Castile Soap—Formula for a simple and useful powder—The use of the tooth powders, pastes, and washes, daily advertised, to be avoided—No article of this kind should be used, unless the ingredients, of which it is composed, are known—Attention to the teeth during sickness—Care to be observed in taking medicines, which may injure the teeth—Effects of mercury upon the teeth and gums, when used to such an extent as to produce salivation—Tobacco: its effects upon the teeth and gums—Snuff, as a dentrifice, highly injurious—Prevention of other diseases of the mouth—Substance of the contents of the chapter in a condensed form.

WE have endeavored to point out, in as clear a manner as the limits and character of this little treatise would permit, the causes which produce the ordinary diseases of the teeth and mouth; and we will now attempt to consider them in relation to another very important part of our subject: the most effectual means of preventing attacks of these diseases. This is a subject which has been passed over, in almost perfect silence, by writers who have examined the causes, and indicated the proper treatment, of these diseases, with the greatest minuteness. But as nearly all the works upon Dental Surgery, which have hitherto appeared, have been written for the profession, exclusively, it may have been thought that the practitioner, who had obtained a just appreciation of the causes productive of diseases, of the teeth and mouth, would find no difficulty

in directing effectual preventive measures. Directions for this purpose must, indeed, resolve themselves into two: attention to the general health, and cleanliness of the mouth. But, however unimportant a chapter of this nature may be, to the practising dentist, it cannot be useless to the community, if it point out the circumstances under which it is necessary to pay especial attention to the general health, and present, in detail, the means by which the mouth may be most effectually kept in a cleanly condition.

In all efforts toward the prevention of diseases of the teeth, reference must be had, distinctively, to the causes by which they are produced. Of these diseases we will now take up, as the most important, that which is known as decay of the teeth.

We stated, when engaged with that part of our subject, that the causes which produce decay, of the teeth, are divided into two series: predisposing and exciting; and of these we attempted to convey to the mind of the reader as clear an idea as we could. The first preventive measures should have reference, then, to those causes that give, to the teeth, this susceptibility to decay, which we termed predisposition. And, although, under many circumstances, all our efforts will be of no avail; under others, they may do much toward the accomplishment of this object. If the reader will turn back and go over what has already been said, in chapter IV., of these causes, that which is to follow will become much more intelligible. Predisposition to decay, in the teeth, it will be there found, is generally dependant upon some defect in their structure. When this is a consequence of hereditary transmission, nothing, of course, can be done to prevent it. It is often dependant, too, upon constitutional disorder in infancy, but of this it is useless to say any thing, for parents will be anxious to guard the health of their children for other reasons than the preservation of their teeth. It will be remembered that the permanent teeth commence forming almost

as soon as the temporary teeth, and that the two sets are intimately connected together up to the time when the first is shed. We have stated that those causes which affect, seriously, the health of the first set, or of the mouth, whilst they remain, always interfere with the perfect development of the second teeth. It becomes necessary, therefore, to take measures for the removal of any causes which can contribute toward this effect.

The irritation attendant upon difficult dentition will, in a proportionable degree, interfere with the perfect development of the second teeth. The proper course to be pursued, under such circumstances, has already been pointed out.

After the first teeth have made their appearance, every care must be taken to keep them in a cleanly condition. The mouth and teeth of the infant should be washed at least twice a day; this the mother or nurse may readily do with her finger, covered with a piece of linen rag, wet with water. Between the teeth, too, waxed floss silk, or common linen thread, previously soaked in water, should be passed, daily. This may seem, to some, too troublesome, to be put into practice; but it should be considered that all preventive measures to be, in any degree, useful, must be commenced as soon as the teeth make their appearance. The first approaches of decay must be prevented, for, after it has once attacked the teeth, no matter how slightly, it may affect them, it can never be arrested, except by means of the operations proper for that purpose. But there is another consideration, which should make any trouble of this kind lightly regarded by the mother: the injurious influence which a diseased condition of the mouth may exert upon the health of the child. We have shown, in some degree, the great injury which adults, sometimes, suffer from this cause, and how much more reason is there to suppose that the child, in all other respects less capable of bearing up against morbid influences, should escape general disorder under like circumstances. It has, besides, always been unaccountable to us how mothers, who appear

extremely solicitous that their children should present an attractive appearance, and who will spend several hours, every day, in dressing them, and curling their hair, should be totally regardless of the cleanliness of their mouths. It is strange that they, of all others, should be blind to the shockingly disgusting sight of black and diseased teeth, as accompaniments to a bright and otherwise beautiful face. The mouth should be regularly cleansed, by the mother or nurse, in the manner directed above, until the child becomes old enough to use a tooth-brush, itself, when a soft one should be selected and placed in its hands; and the mother should always make it her duty to see that it is regularly used, night and morning. At first it may be necessary to urge the child to do this, but it will soon become a pleasant habit, which will not be relinquished during life. It should be provided, too, with floss silk, or a material of the same kind, which it should be made to pass, daily, between the teeth. In this way, too, any accumulation of tartar upon them will be effectually prevented.

Floss or untwisted silk, of which we have spoken several times, is of great value, in keeping the lateral surfaces of the teeth free from extraneous substances. When waxed, it will readily pass between the closest teeth, and effectually clean out any thing which may be lodged between them. As, however, it is expensive, and may not be within the reach of all, a tolerable substitute may be found in common linen thread. This should be softened, in water, previously to using it for this purpose.


Particular caution should be observed, at this period, to avoid, if possible, the use of any medicines which exert an injurious influence upon the teeth. Mercury, in any of its forms, administered, injudiciously, at this period, will interfere with the perfect development of the second teeth.

We will now suppose that, in consequence of close and regular attention, the temporary teeth have been kept in a healthy condition, up to the time when they commence giving place to the permanent set. As irregularity of the

teeth is another predisposing cause of decay, sufficient care must be taken, as the second teeth make their appearance, to prevent it, or, when it does happen, to obviate it at once. The manner of doing this has, already, been pointed out. Never allow sound teeth to be filed for the purpose of correcting irregularity. If the methods, we have described, for accomplishing this object, cannot be, effectually, adopted, (and, in young persons, we cannot conceive of a case to which they are not applicable,) the teeth had better be allowed to remain in their irregular positions, than to attempt to bring them into their proper places by the use of the file. The objections to this practice have been shown, in chapter II.

If constant attention, such as we have here directed, have been paid to the teeth, in infancy, and early childhood, and the child have not, at that time, been attacked with any violent inflammatory disease, or inherited defective teeth, those of the permanent set will not be found liable to decay. But even if the second teeth come out in a perfectly healthy condition, they are not entirely exempt from attacks of decay. Subsequent circumstances may give, to the exciting causes, such a degree of virulence as to destroy the soundest and firmest teeth. All circumstances being alike, however, they will resist the attacks of disease much longer than those which are defective in structure. Where the health, subsequently, is good, and proper care is taken, no fears need be apprehended that they will ever decay.

But, although, those teeth which are firmest, in structure, are liable to be destroyed, by subsequent exposure, to the exciting causes of decay, it does not follow that those which are very defective in structure, should, necessarily, always be lost. In both cases, attention, properly directed, will, generally, prevent the action of the exciting causes. The principal object of this chapter is to point out, in detail, the best methods of directing this attention.

 We have endeavored to show, in that part of our treat-



tise, devoted to the subject, that decay of the teeth is produced or excited, by the action, upon them, of the fluids of the mouth in a disordered condition. These fluids may become disordered in consequence of general derangement of the health; of diseases of the mouth; and of being retained in the mouth, until they undergo decomposition.

Any causes, therefore, which disturb the general health, will, in a greater or less degree, have a tendency to produce this effect. But it is not our province, here, even if we possessed the necessary ability and information, to indicate a course of general hygiene. Good works of this character are within the reach of all, and may be consulted with advantage.

Our business is, principally, with the local exciting causes of decay. To some extent, in the mouths of the most healthy individuals, the fluids of this cavity are liable to become more or less disordered, but it is nearly always in the power of the patient to prevent their injurious action upon the teeth. We have shown that decay usually commences upon those parts which are most difficult to keep in a cleanly condition, as between them, and in the depressions of the molar teeth. It is on this account that irregularities favor the progress of decay. In the prevention of decay, of the teeth, we cannot urge, too strongly, the necessity of the earliest attention, for, we repeat, that, after it is once developed, even in the most trifling degree, the operations we have already described can, alone, arrest it. The importance of this advice, therefore, will at once be appreciated.

During the time when the permanent teeth are succeeding those of the first set, the greatest attention must be paid to them, as they make their appearance. And this is especially necessary when the first teeth are in a state of decay. Between the ages of six and fourteen years there is more danger to be apprehended than at any other time, and disease usually commences at this period

which, if not arrested, in good time, may end in the destruction of the whole of the teeth. We will now suppose that all the second teeth are coming out, in a regular manner, and, if it is not so, every thing must be done to give them a regular direction. If the habit of using a brush, daily, have not, already, been formed, it is time, now, that it should be.

It may be well to say some words, here, with regard to the tooth brush, against which some persons urge this objection : that its constant use is liable to wear away the enamel and, thus, destroy the teeth. This objection, however, is unfounded, for, if a person were to occupy the whole of a long life time brushing at his teeth, it is not likely that, at the end of the time, the bristles of the brush can have exerted enough friction to have made any considerable impression upon the flinty structure of the enamel. Others, again, say that they have never used a brush in their life time and that their teeth remain sound. There are some whose teeth are of such firm structure, and who have such perfect health, that, if they were to pay no attention, whatever, to their teeth, they would continue sound to the end of life. But on more than one occasion we have been consulted, by such persons, to know why their teeth, without exhibiting any signs of decay, became loose, at an early period, and dropped out. It was in consequence of this neglect, for, although there was no tendency to decay, in their teeth, tartar had formed upon them ; this, at first, soft, might have been very readily brushed away, but, neglected, it gradually collected on the roots of the teeth, insinuating its way under the gums, till the attachments of the teeth to their sockets were, at last, destroyed.

During the night, as we have before stated, there is always a collection of small particles of tarter, glued to the teeth by the tenacious mucous, and this cannot be removed by merely rinsing the mouth with water, or the use of the finger ; a brush, only, will remove it effectually. In choosing a brush, one sufficiently hard to remove

all the mucous from the teeth, without being so hard as to injure the gums should be selected.

In using the brush it must not only be passed over the front surfaces of the teeth, but must be carried to all parts which can be reached by it. And brushes may be procured which are so constructed that they will be found, readily, to reach the inner surfaces of all the back teeth. Water is, generally, sufficient to use with the brush, but a simple dentrifice sometimes becomes necessary. Fine Castile soap is about as useful, for ordinary purposes, as any thing which can be procured. It cleanses the teeth, leaves the mouth in a sweet, pleasant condition, and, from its alkaline qualities, neutralizes any acid which may be present. Another simple dentrifice is composed of prepared chalk and pulverized orris root, in equal proportions. When there is a very great predisposition to an accumulation of tartar upon the teeth, a small quantity of finely pulverized pumice stone may be added to the above. The following are about the proper proportions in which they should be compounded :

Prepared chalk—two parts.

Pulverized orris root—two parts.

Pulverized pumice stone—one part.

To this may be added a few drops of any one of the essential oils, which is most agreeable. This tooth powder may be used about twice a week, in the morning; the patient should not, however, neglect to make daily use of the brush with water, simply, or with Castile soap.

With regard to tooth powders they are not so often necessary as is supposed; and, when the mouth is in a healthy condition, that above indicated will answer every purpose. We cannot use language too strong to guard the public against the multitude of tooth powders, washes, and pastes, which are daily advertised as possessing wonderful efficacy in whitening the teeth, curing diseases of the gums, and preventing and arresting decay. An acid, of some kind, very commonly, enters into the composition of those which produce the most striking effects,

in rendering the teeth white, and if used, for any length of time, as may be gathered from what has been said, will, inevitably, result in their destruction. When the gums are diseased, and inflamed, the disorder is, generally, as we have already stated, dependant upon some local cause, which must be removed, before they will heal; without which all the tooth washes, that were ever invented, will not produce the slightest permanently beneficial effects. As regards decay of the teeth, cleanliness is the best preventive, and, after it is once developed, no powder nor paste will arrest it. If it were made a general rule never to purchase any article for cleaning the teeth, no matter how highly, or by whom, it is recommended, without knowing the ingredients of which it is composed, a great deal of injury would be prevented. When the mouth is in a healthy condition, we repeat, the above tooth powder will answer as well as any that can be prepared, with a dozen different ingredients; and when in a disordered condition, the proper measures should be, at once, taken to restore it to health.

The brush should be used in the evening, on retiring, and in the morning, before breakfast. Some persons are under the impression that it is of much more consequence to cleanse the teeth at night than in the morning; what we have said of the accumulation of tartar upon the teeth during the night will show that that this is a mistake. If neglected, at either time (but there is no reason why it should not be used night and morning) at night is of less consequence.

After having used the brush, thoroughly, on all the teeth, waxed floss silk should be passed, carefully, between them. This article, or some other which answers the same purpose, is indispensable in the toilet; it answers all the purposes of a tooth pick, and much more effectually removes every particle of extraneous matter from between the teeth. Besides cleaning the teeth at those places where they are most liable to decay, it is useful in detecting this disease when it is first developed. As long as the silk

passes readily and smoothly between all the teeth, it will be certain that those parts which it touches are sound ; but the moment the smallest portion of the enamel is removed by decay, it is, at once, detected, for the surface will become more or less roughened, and the silk will catch upon the ragged edges.

After every meal the mouth should be thoroughly rinsed with water. The floss silk, if it is at hand, should then be passed between the teeth. But to many persons circumstances render this very inconvenient if not, at times, impossible, and a very good substitute is a common quill tooth pick. The use of a metallic substance, for this purpose, is injurious, for they cannot fail, in a greater or less degree, to wear away the enamel. If a quill or a piece of whalebone cannot be readily procured, a piece of soft wood will answer the purpose. Cleansing the teeth, in this manner, after eating, should never be neglected. The use of a brush will, rarely, be necessary, at these times, as the friction attendant upon mastication will serve to keep the outer and inner surfaces of the teeth clean. All that is to be feared is a collection of food between them ; and this will be entirely prevented by the use of the floss silk, or tooth pick, and rinsing the mouth thoroughly with water.

There are many persons who, from habit, or the presence of tender teeth, eat, invariably, on one side of the mouth. This is a very injurious practice for, without the greatest care is observed in keeping the teeth of the side, which is not used, clean, extraneous matter, in greater or less quantity, will collect upon them. If masticating on one side of the jaw, exclusively, is the result of habit, it should be, at once, corrected ; if a consequence of diseased and tender teeth, they should be so treated as to render them useful, or else they should be extracted without delay.

During an attack of constitutional disorder, especially when fever is present, the teeth become particularly liable

to decay. During such time, whenever the patient is able to bear it or to do it himself, they should be cleansed with the brush two or three times a day, and the tooth powder with the pumice stone frequently used. This will not only preserve the teeth, but will contribute much to the comfort of the patient, for, under certain circumstances, attendant upon febrile affections, as is well known, the mouth becomes exceedingly foul and unpleasant. Care should also be observed, at such time, to rinse the mouth, thoroughly, after medicines have been taken, and those of an acid nature, when required, should be taken through a tube, so as to prevent their injurious action upon the teeth. A judicious physician, however, will not neglect these things, for he will always be careful, in endeavoring to restore his patient to health, not to treat him in such a way as to inflict a lasting injury, even though it should be considered a trifling one. After recovery from an attack of disorder of any kind, the patient should not fail to submit his teeth to a thorough examination; for it may be that, notwithstanding all his efforts to preserve them, some may have suffered.

As we have alluded to the care necessary to be observed, to prevent the injurious effects of medicines, in this respect, it may be well to say a few words, here, of the effects of mercury upon the teeth and gums. Where this medicine is used to such an extent as to produce salivation, the effects produced are always more or less injurious. The teeth become tender to the touch, the gums inflamed and swollen, and the breath offensive. The tendency to accumulations of tartar upon them is, at this time, as we have stated in another place, greatly increased. If the salivation is slight its visible effects upon the gums will pass away with the action of the medicine; but it is believed that they are, subsequently, much more liable to become diseased. If the medicine have been given till the salivation is excessive, the worst consequences upon the teeth and mouth ensue. The action of the absorbent vessels is



greatly increased, the sockets of the teeth are destroyed, the gums ulcerate and are sluffed away, and the teeth become loose and drop out. Adhesions of the cheeks to the jaw, and horrible distortions of the mouth sometimes follow. These are effects, however, of the injudicious administration of this medicine, only, and we would not be understood to attempt to urge any thing against its use, for in many cases it is, doubtless, an invaluable remedy, and in the hands of a skilful physician will not be used so as to cause injury, of this kind. It is recommended, when salivation occurs, to rinse the mouth, frequently, with tincture of myrrh, or dilute chloride of soda. After having recovered from salivation it will generally be found that more or less tartar has accumulated upon the teeth; this should be, at once, removed, for the gums cannot recover their health while it remains. The gums, if at all diseased, should be then treated, in the manner directed in the chapter upon that subject till, health in them is restored.

The use of tobacco has long been regarded, by many persons, as contributing to the preservation of the teeth; but the experience of those who have, for a long time, observed its effects upon the mouth teaches, that, in most cases it is, indirectly, rather more injurious than directly beneficial. Some persons, it has been found, may use it, almost, with impunity, whilst others experience very bad effects from it. The only way in which it can act beneficially is by inducing an increased flow of saliva, by which the action of such destructive agents as may be contained in the interstices of the teeth is counteracted. But in many cases it is found to produce more or less inflammation of the gums and absorption of the sockets. Where the mass of tobacco is kept in one place, as is the practice of some tobacco chewers, the gum and sockets of the teeth at that place are sometimes entirely destroyed. As a preventive of toothache, it is generally effectual with such, only, as do not use it, habitually; and it is found that as

many persons who use tobacco are subject to this painful affection as those who do not use it at all.

The use of tobacco affects, seriously, the health of some persons, and with such its effects upon the teeth are always bad.

What we have said here has had reference principally to the chewing of tobacco. When smoked its effects upon the gums are very similar. If a pipe be used its action upon such teeth as support it is very injurious as, by it, they are frequently worn away.

Snuff is, sometimes, used as a dentifrice, under the supposition that it is a preservative of the teeth. In some parts of the country, amongst the females, this is a very prevalent custom, and from at first using it for the purpose of cleansing their teeth its use, at last, becomes, like chewing tobacco, a habit which it is very hard to get rid of. This is a very disgusting practice, and that no one may find any excuse for falling into it we will state that, far from being valuable, as a dentifrice, snuff is much more injurious to the teeth and gums than tobacco in any form. Being reduced to a fine powder its particles insinuate themselves under the free edges of the gums, and produce all the effects of tartar, in these situations, besides furnishing in each place a nucleus for the collection of tartar. A distinguished writer upon dental surgery and an observer of long experience, with regard to this subject, uses the following language :

“I have observed, that the gums of persons, who have used snuff as a dentifrice, for a length of time, usually have a dark purple, and sometimes a yellowish appearance, are soft and spongy, more or less isolated from the teeth, and that the teeth themselves are not unfrequently very much loosened. In fact, I do not recollect ever to have known an instance, of an individual who had used tobacco in this way, two or three times a day, for several years, without the teeth and gums being thus affected. In some cases, however, it is much longer in producing these deleterious

effects, than in others. Much depends upon the condition of the gums, at the time its use is commenced. If they be healthy, and firmly adhere to the necks of the teeth, it may be employed for a considerable time, without being attended with any very obvious injury; but if they be at all diseased, a deleterious effect will soon become manifest. Viewing the subject in this light, and believing the opinion that I have here advanced, to be supported by the observation of every one, whose attention has been at all directed to the subject, I cannot but condemn the use of this article as a dentifrice; and recommend to every dentist, to particularly caution persons consulting him, and especially females, against thus employing an article that is productive of such pernicious consequences to the teeth.

“Nor are its effects upon the general health less injurious. Persons who use snuff in this manner, are generally observed to have a pale, sallow countenance, especially if their constitutional health be at all delicate.”\*

When the mouth is in a healthy condition the best tooth wash is pure water, and the best preservative cleanliness. A dentrifrice, acting chemically, will rarely ever be needed, if proper care is observed to keep the teeth clean.

As regards a preventive of accumulations of tartar upon the teeth, that which has been said above is applicable. Rigid cleanliness will, in all cases prevent its formation.

In treating of diseases, of the teeth, we stated that they were, sometimes, entirely deprived of vitality, and expelled from the jaws. Where this is the result of accident, it cannot, of course, be guarded against. But we have mentioned that it is also a result of large accumulations of tartar upon the teeth, violent inflammation of the gums, excessive effects of mercurial medicines, &c. The general directions we have given for keeping the mouth in a cleanly and healthy condition, will apply, with equal force, here, also. With regard to other diseases of the gums, sockets, and the antrum, so far as they are dependant

\* Harris' Principles and Practice of Dental Surgery.

upon the teeth, it will be at once seen that they will be prevented, if the teeth are preserved in a healthy condition.

It may be useful to present here, in a condensed form, the substance of what has been said, above, so that every one may have, at a single view, a plan for the preservation of the teeth, to which reference can readily be made.

1. Relieve, as quickly as possible, excessive inflammation of the mouth, at the time when the infant teeth are coming through the gums.

2. Attend, carefully, to the health of the child.

3. Keep the temporary teeth clean, by washing the mouth of the infant several times a day, and passing between the teeth some material, such as floss silk, to cleanse the lateral surfaces.

4. Induce the child to form, at an early age, the habit of using a suitable brush.

5. Do not allow the first teeth to be extracted, except when they prevent those of the second set from taking a regular position in the jaws.

6. When the second teeth are succeeding those of the first set, pay especial attention to cleanliness of the mouth, and take the necessary precautions to prevent irregularities.

7. If the second teeth should be irregularly situated, lose no time in having the irregularity corrected; but never allow sound teeth to be filed for this, or any other purpose.

8. Avoid those causes which may affect the health of the digestive organs.

9. Be very cautious in taking medicines, which, by contact with the teeth, can injure them.

10. Make use of no tooth-washes, powders, or pastes, unless you are aware of what they are composed, and then let them be of the most simple materials.

11. From the first appearance of the second teeth, use every means to keep them always clean: by using a suit-

able brush, night and morning ; by passing between them, every day, some material which will effectually cleanse their lateral surfaces ; and by always washing the mouth, thoroughly, after eating.

These directions, it will be seen, are very simple, and yet, if they were rigidly put into practice, few persons would lose their teeth at an early age.

## CHAPTER XIII.

### CONCLUSION.

Steps to be taken by those who find their mouths in a diseased condition—Treatment to be effectual must be thorough—How is a patient in selecting a dentist enabled to judge between the good and bad?—First requisite a good moral character—This, however, not sufficient of itself, to constitute a good dentist—Knowledge of principles necessary—Practical skill all important—Be careful of plausible advertisements—Fees—Generally regarded as exorbitant—Reasons why dental operations must be expensive—Great care required to perform them well—Expense of education, instruments and material—Difference between good and bad operations upon the teeth, illustrated—Their worth can be tested by time, alone—Cheap dentistry always dearest ultimately—The charge of high fees not necessarily a guarantee of good operations—But very low, indisputable evidence of bad ones—Better let the teeth decay than resort to those in whom you cannot place full confidence—People residing at a distance from large cities more liable to suffer from inposition than any others—Proper remedy for this—Students of medicine might, with advantage, make this a branch of their studies—Some suggestions to the patient upon the course he should pursue toward a dentist when he believes him to be competent.

As the preventive treatment, indicated in the preceding chapter, must be commenced, in order to be effective, at a very early age, before a child can feel the importance of preserving the teeth, it will depend upon parents or those who may have charge of children. As these, either in consequence of the want of a due sense of its importance, or of the requisite knowledge, may often neglect to take the necessary precautions, many persons will, on reading this treatise, find their mouths already in such a diseased condition as to be entirely beyond the reach of preservation by these means. To such we can only say that you must select some dentist in whose ability and integrity you have full confidence, and submit your mouth to a thorough



course of treatment. The tartar, if any have formed upon your teeth should be first removed; and, such teeth or roots of teeth as cannot be preserved, extracted. The gums should then be put in a healthy condition, and such teeth as are decaying, treated so as effectually to put a stop to the disease. If this treatment is commenced, do not allow it to be half completed; for you will not, in that case, receive much benefit, but let it be continued till your mouth is placed in a healthy condition. If the treatment have been thorough and judicious it is, now, as much in your power to prevent future attacks of disease as if your teeth had always remained sound.

But the question presents itself here: By what means are the qualifications of a dentist, to be ascertained, by the patient, as there are so many engaged in the practice of dentistry, for which they are, altogether, unqualified? This, to some extent, may be done by all who will exercise a little discrimination, and judge according to the standard, furnished by this work.

The first requisite in a dentist is a good moral character. Enquire into his dealings with the world; if, in these, he show himself to be fair and honorable, you may, certainly, place more confidence in his desire to do well, what you may require him to do for you. But if he show himself disposed to defraud those with whom he has ordinary dealings, we would advise every one to shun him, as a dentist, for if he will act dishonestly when there is every probability of detection, the field for imposition is here so ample, and so much sheltered from observation, that it is not likely he will let such an opportunity escape him unimproved. No matter how well you are acquainted with the principles, and even the details of practice, of dental surgery, you will be compelled to trust, in some degree, to the honesty of the dentist, you employ; especially as regards preservative operations upon the teeth.

But a man may be as honest and upright, as possible,

and yet be totally unqualified to practice dental surgery. For it does not follow that one who attempts to do that which he does not at all, understand, is necessarily, an imposter. He may be fully persuaded that he possesses all the knowledge and skill, requisite to constitute the most accomplished practitioner, and yet be ignorant of the very first principles upon which the art, in which he is engaged, is founded. In proportion to his ignorance will, perhaps, be his confidence. Of this class of persons there are many, we know, engaged in the practice of dentistry.

Although this should be regarded a very great requisite it will be seen that integrity of character, alone, does not constitute a good dentist, or, indeed a good member of any profession. He must, also, have knowledge. Enter into conversation with him about his profession, and ascertain what he knows of its principles. But do not be blinded by a great array of technical terms—no sensible man, indeed, it seems to us, in talking to his patients will endeavor to thrust these upon them—if they are used stop him, at every sentence, if necessary, and demand an explanation; if he understand what he means, himself, this he will be readily able to give. To a person of a small degree of penetration if he have read with any care the preceding pages, will soon arrive at some notion of a dentist's theoretical knowledge. Allow him to examine your teeth and see how his advice accords with the knowledge you may have acquired from reading the preceding pages.

The author may safely recommend this course without exposing himself to the charge of presumption. The principles he has presented are not those upon which he, exclusively, founds his practice—they are those which are, generally, acknowledged as the basis of all good practice.

But it is not only necessary that he possess integrity of character, and theoretical knowledge, he must, also, be well practised in the common manipulations. If this were

not the case every man could, in a little while, become acquainted with the principles of dentistry, and could then practice in his own family. But skill, in this important department, can be attained by practice, alone. Theoretical knowledge, after all, is useful, so far, only, as it is a guide to thorough and efficacious practice. Inquire then, of the dentist, if he is a young practitioner, or of those who may be acquainted with his history, where and how he obtained his knowledge of his profession, what were the qualifications of his teachers, and how much time was occupied in acquiring dexterity in the practice. If he is an older man, and has been for some time engaged in the practice, enquire, amongst his patients, if they are accessible, how his operations have stood the test of time. Whether the fillings he inserted came out, frequently. Examine the mouths of some of them, yourself, if they will permit you to do so, and ascertain if the fillings have the appearance, described in another part of this book.

Do not be deceived by plausible advertisements. If a dentist advertise that he is in possession of some valuable remedy, unknown to any of the rest of the profession, be extremely cautious how you avail yourself of the advantages he offers. A man engaged in the practice of any profession, which involves the health of the community, if he have, at heart, the good of the community, will not feel at liberty to conceal, for his own private benefit, any important discovery he may have made, but will freely communicate it. Suppose Jenner, when he discovered the effects of vaccination, had used it for his own benefit, exclusively, he might, undoubtedly, have amassed untold wealth; but what would not the world have lost? A dentist, therefore, who, to attract the public to his establishment, claims the exclusive knowledge of some important remedy cannot, certainly, be regarded as possessing the first qualification of a good dentist. It is very possible, too, indeed it is highly probable, for the thing occurs,

daily, that his great secret, if it is worth any thing, has been long in the hands of the profession.

Do not be taken in by the advertisements of what are called "cheap dentists." If the only inducement they offer for patronage consists in operating for less than what the majority of the members of a profession believe to be fair and honorable charges, this, it seems to us, is not sufficient to inspire confidence in their ability. They are, probably, the best judges of the worth of what they do, and estimate it accordingly.

With regard to the fees charged, by the profession, which has long been the subject of much animadversion, the author feels himself called upon to place the matter, as far as he is able, in its true light. It has been said that they are, generally, exorbitant and oppressive—so much so that people, in moderate circumstances, are frequently unable to avail themselves of the advantages offered by the art. That this charge, to some extent, is merited, the author, of this work, cannot deny—but it is not, probably, so often the case as is, generally supposed; and imposition of this kind it is well known, has been more frequently practised by unqualified persons, than by regularly educated members of the profession.

There are several reasons why operations upon the teeth, in the present state of dental surgery, must be expensive. The cost and time of acquiring the necessary information; (it must be remembered that we are not now speaking of those who, without any instruction, have entered upon the practice of dentistry; but of a thoroughly educated dentist, and such it is the interest of the community to encourage;) the cost of instruments and the material used; and the great care which is required to perform operations so as to be useful. It is necessary, too, that a dentist in a city, especially, should present a respectable appearance. He cannot take a house, in the suburbs, where the rents are low, nor can he reside in a by-street or court, near the business or fashionable parts of a city.

If he were to do so, he would remain undiscovered, or the fact that he occupied an humble domicil would be regarded as indubitable evidence that he is totally unqualified to practice his profession. This, although by some it may scarcely be regarded as a good reason, is as necessary to be taken into the item of a dentist's expenses as the cost of his education.

The cost of the material employed is very great. We will instance the operation of filling. We have shown that, for this purpose, the only material which can be made to answer fully, under all circumstances, is gold, of which no inconsiderable quantity is used, in filling the cavities of some teeth. But, it will be asked, how is it that dentists advertise to fill teeth with gold, and warrant the operation to give satisfaction, for about one fourth or one third the ordinary charge? We answer, that the same cavity may be filled with one fourth the quantity of gold which should, properly, be used to fill it; but then the object proposed by filling it will not be accomplished. To exclude, entirely, the fluids of the mouth, which, to preserve decayed teeth, we have shown to be essential, the gold must be packed in so as to give it great solidity; and it will always be found, in a large cavity, especially, that, after it is first filled, up to the surface, if care is not taken to pack it firmly down, to the bottom, treble the quantity may be afterwards forced in. If the gold is folded, into the cavity, in the way we have described, it will, generally, be equally as solid at the bottom as at the surface; but it may be so inserted that the whole body of the filling will be loose, whilst just at the surface it will be quite firm. This may seem almost incredible, but it is, nevertheless, true. A filling, of this kind, may be detected by pressing down a strong, sharp pointed instrument, into the centre; but, so hard may be the surface, that great force is sometimes required to penetrate it.

There is another fact which will account for the remarkable cheapness of these operations. It has been stated



that, unless every particle of the decayed bone is removed from the cavity, in performing the operation of filling, the decay will not be arrested. To do this perfectly, requires, in most cases, a great deal of time and labor. It is very easy, indeed, to cut out the decayed portion situated in the middle of the cavity, and, in this manner, prepare a place, which, for the time, will retain a filling. With so much facility may this be done, that a cavity, which, to be filled so as to preserve the affected tooth, would require from half an hour to two hours, to prepare it, may be filled in a few minutes. What we mean will be made clear by aid of the accompanying drawing, which represents the grinding surface of a molar tooth at an early stage of decay. It will be seen that, in the centre of the

Fig. 28.



crown, is a small, round, dark spot, from which, in four directions, extend what appear to be cracks in the enamel, filled with a dark substance. This is the way in which decay, usually, attacks the grinding surfaces of the molar teeth. Now it can be very readily seen that, to cut out a small part of decay, from the centre of the tooth, will furnish a cavity of sufficient capacity to retain a filling, whilst, to remove all the decay, which is represented by the dark cracks extending from the principal cavity, as the bone near them is hard and sound, must require considerable labor. But, without every particle of this decayed matter is removed, the tooth will continue to decay, and the operation will be useless ; worse than useless indeed, for the patient, believing that the disease is extirpated, takes no further trouble, whilst the decay is eating its way down to the central cavity of the tooth. A filling of this description may, if packed in firmly, keep its place for several years, but, when it does come out, which will invariably be the case, sooner or later, the tooth will, in all probability, be too much decayed to be preserved by any operation. In this



way a dozen, or probably twenty teeth, may be filled in the time required to fill a single one, properly; we have frequently heard patients say that in the course of one or two hours they have had ten or twenty teeth filled. It will always be necessary to, in removing the decayed portion more extensively, to increase the size of the cavity, and a greater quantity of gold will necessarily be required to fill it. With some of the rest of the teeth, as, for instance, the incisors, when decayed on their lateral surfaces, much care is necessary to give to the cavities such a shape that the fillings will be retained, even for a short time. This is the reason why the operation, when performed upon these teeth, in the ordinary manner, so frequently fails; and it will explain why, by a common and numerous class of practitioners, they are regarded as so difficult to fill, whilst, in reality, they are quite as easy as any of the rest of the teeth; much more so, indeed, than a great many others. It may be well to state, here, that, whenever the tooth, around a filling, becomes tinged with blue, it is decaying; the filling should, in such a case, be immediately removed, and the operation performed over again, in a proper manner.

With most other operations, upon the teeth, the same care is required for their perfect performance. The removal of tartar, from the whole of the teeth, no matter how much they may be coated with it, may be done in a few minutes, when, sometimes, several hours are necessary to remove it, perfectly; and we have shown that, unless this is done, it will accumulate, again, with the greatest rapidity, in spite of the utmost care, on the part of the patient. Filing the teeth, for the removal of decay, must be thoroughly done, or it will be useless; and to do this, requires time and patience. The same remarks hold good with regard to the preparation of artificial teeth; but, in these cases, the patient can generally tell when they fit well, and are comfortable, and he should never pay for them till he finds them to be so. The greatest deception

is, generally, in the quality of the gold used. When used for the purpose of preparing plate, for the attachment of artificial teeth, it is necessary to alloy it in the proportion of about six parts of alloy to eighteen of gold, as the pure gold would be too soft to answer the purpose. But, in order to enable them to insert teeth, at a very low rate, dentists, sometimes, alloy it so much that it soon undergoes decomposition, to a considerable extent, in the mouth, turns black, and becomes very injurious; the patient generally believing this the usual result of the action of the fluids of the mouth upon all metals.

After considering these facts, will you any longer wonder why some practitioners can operate for so much less than the ordinary rates. Far from considering it a recommendation, always regard with suspicion, and avoid, the dentist who advertises that he can operate for much less than any body else, engaged in the profession, without, indeed, he has discovered some method of operating, effectively, with railroad speed, or has discovered a metal, no more costly than clay, which will answer all the purposes of gold.

Do not be deceived, either, by a promise held out, to warrant the success of operations—or, rather, as the expression usually runs, that “all operations are warranted to give satisfaction.” It is a very easy matter to satisfy a patient who is entirely ignorant of what ought to be done, to his teeth, and the manner in which it ought to be done. A patient of this description, will, indeed, be better satisfied, at the time, with operations badly performed, than with those which are performed in the very best manner; and for this reason: most operations, on the teeth, as may be easily conceived, are exceedingly tedious and fatiguing, and few can bear, with equanimity, the head fixed, and the mouth stretched open to its widest capacity for two or three hours at a time. A patient may, therefore, become wearied and dissatisfied, at the time taken up with the performance of good operations, and be apt to believe that

the length of time employed is owing to a want of expertness in the operator; but, on the other hand, may be delighted that long dreaded operations, have been easily effected, when he finds that, after a pleasant hour or two, his mouth is put in "complete order." It is impossible for patients to ascertain, at the time operations are performed, on the teeth, whether they are well done or not—time alone will show—and the time which must elapse to test operations will, perhaps, be sufficient, in cases where they are badly performed, to render subsequent good ones entirely useless. It will be thus seen that it is a very important matter, to the community, that this discrimination between good and bad dentists should be made, for, generally, when injury is done to the teeth by unskilful treatment, it is irreparable. "Cheap dentistry" will, generally, be found, ultimately, the dearest: not only as regards injury of the teeth, but, also, even in a pecuniary point of view. This will be readily seen; for, if operations are not well performed, it will be necessary to resort to them over and over again, and the patient, if he is so fortunate, before his teeth are entirely destroyed, to fall into the hands of a competent practitioner, will, in the end, be compelled to pay, in addition to the low price for having had them treated badly, the high, or reasonable price, for having them well treated.

Some dentists, we have understood, will warrant a filling for one year,—this proposition should be enough to condemn him, at once. If teeth are filled, as they ought to be, at a proper time, they will be preserved, permanently; and if the patient defer having the operation performed till the teeth have decayed too much to render the result of the operation successful, a good dentist will neither make promises that it will be of permanent benefit, nor hold himself responsible for it. He will do the best he can, in such cases, and promise nothing. When the teeth are in a proper condition for filling, the good dentist does not find it necessary to make any special guarantee, of

the permanence of his operations; he feels such confidence, in the utility of what he does, that it is a principle with him to renew his fillings, which may fail, *at any time* subsequently to their insertion. He does not fill teeth to preserve them for a year, but for a life time; and, (except in the cases alluded to, several times in this work, where the teeth, of certain individuals, are of such very soft structure, that nothing can be done to preserve them, or are too much decayed to be successfully filled,) he feels that he assumes little responsibility in saying that he is ready, at any time, to make good such of his operations as may have failed, even if fifty years have elapsed. When he is not assured of the permanent success of his operations, from any of the circumstances above alluded to, he will always take care to forewarn his patients of what they are to expect.

Be very cautious of those who make extravagant promises; who will induce you to have teeth extracted, which, with care, might be preserved, by assuring you that artificial teeth can be made which are much better than the natural teeth. But the information with which you have been furnished, in this treatise, will enable you to know how far confidence is to be placed in promises of this kind. How often have we known persons to turn away from an honest man, who would promise success so far, only, as he felt himself warranted in doing, and go to one who would promise any thing—and how invariably have we seen them, in such cases, imposed upon. Be cautious of those who are too accommodating.

The author must not be understood to imply, in what has been said with regard to fees, that all who charge high prices are, on that account, alone, more competent; there may be many, and he has certainly known many such, who charge exorbitant prices, and are still totally unqualified for the place they occupy in the profession. But he does say, and the truth of what he says must be admitted, that those who operate for lower fees than can,

possibly, be a remuneration for the material and time, which ought to be employed, in performing operations, upon the teeth, cannot perform them well.

It is impossible to give an exact list of fair rates; cases vary so much, that charges must vary with the difficulty of each. In operations upon the teeth, that of filling, which is the most important, may be performed at a rate ranging in ordinary cases, from one to three dollars, when gold is used: according to the quantity required, and difficulty of effecting the operation. When tin foil is used, about half the price of gold is generally charged. Some cases occur, however, when five dollars, or more, will not more than compensate for the expense and trouble of filling a single tooth with gold. To prevent any difficulty it will always be well for the patient to ascertain the usual charges, of the dentist, from whom, when all is done that he requires, he should demand an account, specifying all that he has done, with the price of each separate operation. No one, who desires to deal justly, will object to this, and it will prevent all dissatisfaction.

It may be said that persons, in limited circumstances, no matter how great a desire they may feel to preserve their teeth, and have required operations performed, will be totally unable to pay what seems to be a reasonable price, for having it done; and are compelled to resort to "cheap dentists" or lose their teeth. There are few persons, indeed, in this country, who, by strict economy, may not be able to save enough from their income, no matter how scanty it may be, for this purpose; and every dentist, who is moved by any benevolent impulses will, in such cases, as far as his circumstances permit, reduce his charges so as merely to be compensated for his outlay for material. A desire to compel unprincipled men, who impose upon the public, and the poorer class, especially, to turn their attention to some means of gaining a livelihood, by which they will not be doing an injury to society, would alone be a sufficient inducement to him to do this. If every good prac-



tioner were to determine to devote a certain portion of his time, every day, to this purpose, he would be doing a great deal of service, both to the profession and the community. But we have, already, said it is no economy to resort to the class of practitioners we have been endeavoring to describe. We have frequently known persons to pay in the course of a few years, double the amount, which good operations would have cost, at first, and finally lose their teeth. This statement may seem, to some, exaggerated, but it is strictly true, as the daily experience of every dentist proves. We would advise such persons, as do not feel themselves able to have their teeth treated in a proper manner, to let them alone, and, on no account, resort to those who, from the very nature of things, cannot do them justice; they will, thereby, preserve their teeth much longer, and save even the sum which would go toward the support of men who deserve execration, rather than sustenance, at the hands of the public. But, we are persuaded that an effort will be generally made, in such cases, to accommodate charges to the circumstances of indigent persons. Where extraction is required, we think there are few who would not, willingly, perform it, without charge, when a person applies who is suffering pain, without any means of paying for the operation.

Those who are most liable to imposition, of the kind we have been endeavoring to expose in this chapter, are people living in the country, where there are no resident dentists. Finding their teeth in a decaying condition, they, sometimes, engage the services of some itinerant destroyer of the teeth, who calls himself a dentist, as a drowning man will catch at straws, in order to save himself. But, in such cases, the straw will, generally, prove a leaden weight, which will only drag them the more rapidly to the bottom. In such cases, too, they have not the slightest redress, for, by the time they discover that they have been imposed upon, which is generally in a very short time, the person by whom they have suffered, is successfully driving his business, in another section of the



country. Such men rarely ever expect to visit the same place a second time ; and, during their stay, take good care to cut closely. It should be made an invariable rule, in such places, never to employ a stranger, without he presents indubitable testimony of his qualifications. It is not sufficient to know that he is from a large city ; he should also show in what estimation he is held there. He should give evidence that he has employed sufficient time to enable him to acquire practical skill, and he should be made to give evidence that he has been, theoretically, prepared to improve the time spent in this way. The time is not far distant, when dental surgery will, generally, be considered an important branch of the medical art, and the practitioner, when he goes to a strange place, will be required to exhibit such evidence of his qualifications as physicians are now compelled to do. The best remedy, at present, for this state of things, in the country, is for the people to provide themselves with competent resident practitioners of dentistry. Young country physicians might, very advantageously to themselves and the community in which they reside, make it a part of their acquirements. But, when a physician determines to acquire a knowledge of dentistry, he must not be satisfied with the knowledge he obtains from books ; he must devote himself, sedulously, under the direction of a competent dentist, until he becomes well skilled in the practice. Or he may obtain this kind of knowledge by attending a course, after he has completed his medical studies, in some good dental college. In many parts of the Southern states, physicians are much engaged, during the sickly season, in the fall, and during the rest of the year, have almost complete leisure. How profitable, if they were to qualify themselves, in the way we have here indicated, might they employ this leisure time, both to themselves and to the community in which they live. This is a subject of much importance, and should be taken into consideration by all students of medicine who design practicing in the country.

We have said a great deal, throughout this work, of what is to be expected, by the patient, from the dentist, and, in conclusion, it will be proper to hazard a few suggestions with regard to the manner in which it is proper for the patient to deport himself toward the dentist. He should, in the first place, satisfy himself, as far as he possibly can, of the trustworthiness of the person he may select to operate, upon his teeth, and should then make up his mind to bear, with patience and fortitude, the fatigue and pain attendant upon what is to be done. He should avoid exhibiting any signs of impatience, when the time required, for the performance of an operation, is greater than he anticipated. It will be better that he should make a number of sittings of short duration, than to act so as to prevent the operator from performing his duties, thoroughly; for, no matter how strongly he may desire to do right, when he finds the patient very restless, he will, in spite of himself, make haste to let him go. We do not mean to say that, when the operation is painful, the patient should exhibit no signs of suffering, for this is impossible; but, except when he is suffering pain, that he should remain as still as possible. We have known patients to ask, twenty times, during the preparation of a cavity, for filling, even when it was not at all painful, if it were not done. Now this is, always, unnecessary, for no one, we believe, is so fond of labor, that he will do more, on any occasion, than is absolutely necessary.

As far as his knowledge extends, he may use his judgment to see how the practice of the operator agrees with his own knowledge; but he must remember that there are a thousand modifying circumstances, which may compel the dentist to deviate, more or less, from the course prescribed in this little treatise. They will always, however, be in accordance with the general principles, laid down; and the reason why deviations are made can always be explained, in a satisfactory manner.

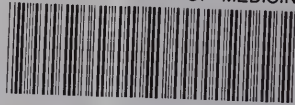
It is, generally, unadvisable to refuse to follow out strictly

the directions of any practitioner, so long, at least, as you are under his treatment. First ascertain, as far as you are able, that, both for integrity and ability, he is to be trusted, and then follow his advice till it conflicts, palpably, with what you know to be correct ; when this is the case, leave him, and endeavor to find out some one who is more worthy of confidence. We have often known persons to lose their teeth, by imagining that they knew better than the dentist what ought to be done, when they might have been very easily saved, if they had followed out the prescribed directions. Although there are many impostors, who call themselves dentists, there are many honorable men, who desire to do the best they can, and who have left no means untried to enable themselves to do well. Lastly, as long as the dentist you employ does well, do not leave him, and go to one who promises to do a great deal more.

And now, that we have completed the task we imposed upon ourselves, as perfectly as time and circumstances have enabled us to do, we leave the reader, with the sincere wish that he may be as much benefitted, by what has been laid before him, as the writer desires that he should be.



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